UNITED STATES PUBLIC HEALTH SERVICE
RUPERT BLUE, SURGEON GENERAL

VITAL STATISTICS

A DISCUSSION OF WHAT THEY ARE AND THEIR USES IN PUBLIC HEALTH ADMINISTRATION

BY

JOHN W. TRASK
Assistant Surgeon General
United States Public Health Service

SUPPLEMENT No. 12
TO THE
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VITAL STATISTICS.

A DISCUSSION OF WHAT THEY ARE AND THEIR USES IN PUBLIC HEALTH ADMINISTRATION.

By JOHN W. TRASK, Assistant Surgeon General, United States Public Health Service.

Vital statistics are the statistics of life.
Morbidity statistics are the statistics of disease.
Mortality statistics are the statistics of deaths.
Birth, death, and migration statistics relate to population movement.
Statistics of births and of immigration show population increment.
Statistics of deaths and of emigration show population decrement.

Statistics have suffered in reputation because of the seeming truth of the trite statement that one can prove anything by figures. In reality figures are but evidence upon which conclusions may be based. If the evidence is faulty and the faults are not perceived, errors in judgment may result. But this is true of all evidence upon which opinions are based and is no more true of figures and statistics than it is of other kinds of evidence.

Statistics are derived from the collection and numerical classification of observations relating to certain facts or events. They are usually limited to the systematic collection and classification of data relating to relatively large classes of events. In the making of statistics the first and essential step is the recording of observations. After the observations have been noted a numerical compilation of their frequency or of the frequency of certain of their conditions or attributes is possible. The derived statistics being but a numerical classification or analysis of the recorded events depend primarily for their usefulness upon the accuracy of the original records of facts. They depend secondarily upon the accuracy of statistical classification and compilation.

The original notation of facts and of the occurrence of events is usually secured in one of two ways, by enumeration or by registration. Observations relating to the population are made for example by enumeration at the decennial censuses. The census enumerators go from house to house and secure certain information regarding each individual. The enumerators are the observers who secure the original data. Statistics of population are made by the classification of the information thus obtained and the numerical compilation of the frequency of certain attributes.

On the other hand, the notation of facts relating to deaths is secured by registration. For each individual who dies there is regis-

tered with an official known as a registrar certain information regarding the deceased and the cause and time of death. Here the observers who record the original data are the physicians, members of families, and undertakers. From the classification and compilation of the information thus recorded mortality statistics are made. Statistics of population depend for their accuracy upon the correctness of the records made by the enumerators and mortality statistics upon the accuracy of the information registered in death certificates.

The statistical method is in itself dependable, although it is true that statistics may be vitiated by the use of inaccurate or incomplete data as a basis or of faulty methods in classification and compilation. Conclusions drawn from statistics by those who attempt to use them may be quite erroneous, but this is more often due to the limitations of the user than to the limitations of the statistics. The most common error in the use of statistics is perhaps the comparing of numerical statements or ratios which are too dissimilar to allow of comparison.

To make dependable statistics the original observations and records from which they are derived must be true and accurate, and the classification, compilation, and analysis must be done by competent individuals. The value of statistics when thus handled is shown by the use made of life tables by actuaries of life insurance societies and companies.

Vital Statistics.

Definition.—Vital statistics may be defined as statistics relating to the life histories of communities or nations. They pertain to those events which have to do with the origin, continuation, and termination of the lives of the inhabitants. They commonly include statistics of births, marriages, and deaths, and the conditions attending these events. With these are usually also classed statistics of the occurrence of disease—morbidity statistics. Morbidity statistics, however, differ markedly from the others in their manner of collection and uses, so that to a greater degree than any of the others they constitute a class by themselves.

Guilfoy has given a descriptive definition which in slightly abbreviated form is that vital statistics are "the numerical registration and tabulation of population, marriages, births, diseases, and deaths, coupled with analyses of the resulting numerical phenomena." [1]

Development.—Vital statistics are not a thing of recent origin. Their development to their present form, however, is comparatively modern. The Egyptians, Greeks, and Romans made census enumerations. Some of the ancients, notably the Romans, required also the registration of births and deaths. The statistical treatment of the records was, however, comparatively limited. During the last

[1] Guilfoy, W. H., Vital statistics in the promotion of public health, New York Medical Journal, Nov. 5, 1910.

century and a half, and more particularly the last 50 years, the treatment of vital statistics has been undergoing a rapid evolution. In their present developed form they give a fund of useful information otherwise unobtainable. They have become an essential to every well-organized community and nation. They give a composite picture of the life history of a people which can be secured in no other way. They furnish a means of comparing the life history of one community or people with that of others and of the present with the past.

Based upon population.—All vital statistics are based upon the population. The frequency of births, marriages, sickness, and deaths is expressed in terms of the population, usually as rates giving the number for each 1,000 inhabitants or class of inhabitants. In comparing different communities or different periods, births, marriages, deaths, and the incidence of disease must be based upon a common unit of population. The first requisite to useful vital statistics is statistics of population showing the number of inhabitants, classified according to age, sex, nativity, race, and occupation. It would be desirable, if possible, to have also a classification according to economic status, as birth, sickness, marriage, and mortality rates frequently vary with the incomes of individuals or households. An understanding of population statistics is therefore the primary essential to the comprehension or use of vital statistics, and statistics of population will be first considered.

POPULATION STATISTICS.

Source of Data.

The principal source of information regarding population under existing conditions is a census enumeration. For the United States these enumerations are made every 10 years. The last census was taken as of April 15, 1910. In the United States a census has been taken every 10 years since 1790, in Great Britain every 10 years since 1801. In taking a census it is desirable in so far as possible to take it at a time when the greatest number of people will be at their usual homes. A midwinter census would find many people absent from the Northern States and an unusual number in southern winter resorts. A midsummer census would find an unusual number at the seashore and at other summer resorts. A number of the States take a census midway between the United States decennial censuses, so that they have an enumeration of the population every five years.

As the only source of definite information as to population is the census enumeration, and as the population is continually changing, in most cases increasing, it is necessary to make estimates of the population for the periods between the census enumerations upon

which to base rates for the various vital events and especially for the accurate computation and expression of marriage, birth, death, and sickness rates.

Nature of Census Information.

The taking of a census consists usually of more than a mere enumeration of all persons living at the time the census is taken. It includes the recording of certain information regarding each individual. In taking the 1910 United States census the following information relating to each individual was recorded by States, counties, and townships, villages or cities: Name; address; sex; color or race; age at last birthday; whether single, married, widowed, or divorced; number of years of present marriage; mother of how many children, total number born, number now living; individual's place of birth, place of birth of his father and mother; year of migration to the United States; whether naturalized or alien; whether able to speak English, and if not, the language spoken; the individual's occupation, the kind of work done and the industry or business in which employed; whether an employer, employee, or working on own account; whether employed or out of work April 15; whether able to read and write; whether attending school; whether he owns the home in which he lives; whether a survivor of the Union or Confederate Army or Navy; whether blind in both eyes, or deaf and dumb.

From the information thus obtained the statistics of population are made. By the classification and numerical compilation of this data it is possible to ascertain the composition and distribution of the population as to sex, color or race, age, marital status, fecundity, nativity, occupation, literacy, blindness, and deaf-mutism.

Sources of Error in Census Enumerations.

A certain number of individuals will be enumerated both at the place where they happen to be and at their proper residences. A few will be missed entirely. However, the degree of error thus caused will not be great.

The margin of error in the securing of ages is greater. The age recorded is customarily intended to be the age in years at the last birthday. The ages given for children under 5 years old are likely not to be accurate due to the tendency to give the age of a child between 6 and 12 months of age as 1 year old and that of a child between 1 and 2 years old as 2 years of age. This tendency to give the age at the next birthday persists up to about the fifth year, although it is perhaps greatest during the first and second year. To avoid the error thus arising, the United States census records the ages of children under two years of age in years and months. For example, a child 6 months of age is recorded as six-twelfths of a year old and a child of 17 months of age as $1\frac{5}{12}$ years old.

Women 15 to 20 years of age are prone to give their ages as between 20 and 25 years. Adults over 25 years of age frequently do not know their exact ages and are prone to approximate their ages as being 30 or 40 or 50 years, and to a less extent at 35 or 45 or 55 years. The result is that there is at each census an exaggerated number of ages of 30, 40, 50 years, and also a lesser exaggeration of ages 35, 45, 55, and 65 years. Individuals over 80 years of age are prone to give their ages as greater than they really are.

There is also a considerable margin of error in the recording of occupation. This is due largely to an imperfect understanding of what is wanted and to the multiplicity of occupations and a lack of knowledge as to their proper designation.

Fluctuation in Population.

Populations are constantly changing. Individuals are continually being added by immigration. In the United States, and more particularly in some sections of the United States, considerable numbers are annually being added in this way. Immigration is also an important factor in the growth of population in certain South American countries, South Africa, New Zealand, Australia, and Canada.

Populations suffer a continuous diminution by reason of emigration. This is especially true of some European countries.

Migrations not only may affect the population of a country as a whole but also may alter the distribution of people within a country. There is in many countries a constant movement of people from rural localities to the cities and from one locality to another.

All populations are also being increased by births and suffering losses by deaths. The rate of change, however, resulting from births and deaths is usually comparatively constant or alters gradually, while the changes due to migrations may be exceedingly irregular. The increase in the population caused by the excess of births over deaths is known as the natural increase. A country in which the birth and death rates are equal and in which the factor of migration is negligible will have a fixed population.

The increase of population in certain countries is shown by the following table:

TABLE 1.—*Showing growth of population of certain countries in millions, 1800 to 1910.*

	1800	1830	1860	1890	1910
France	27	32	36	38	39
Great Britain and Ireland	16	24	29	38	44
Russia in Europe	35	45	68	92	.....
Austria	25	29	34	40	49
Italy	17	21	25	30	34
Spain	10	11	15	17	19
Belgium	.....	3	4	6	7
Sweden	2	2	3	4	5
United States	5	12	31	62	92

The frequency of births, marriages, or deaths is usually expressed as the number occurring during the calendar year per 1,000 population. The figures thus given are known as the birth, marriage, or death rates and are computed upon the mean population—that is, the number of inhabitants estimated to have existed at the middle of the year, July 1. These estimates are necessary for all dates except those on which census enumerations are made. For the making of estimates there are two methods commonly used, known, respectively, as the arithmetical and the geometrical methods. In each method the populations at the last two census enumerations form the known quantities from which the estimates are derived.

Arithmetical method.—In the arithmetical method it is assumed that the increase or decrease in population which occurred between the last two census enumerations took place in equal amounts during each intercensal year and will continue to take place annually in like numbers until the next census shall have been taken. Thus, given a city which had a population of 50,000 at the 1900 census (June 1, 1900) and one of 61,850 at the 1910 census (Apr. 15, 1910), the increase during the intercensal period (9 years and $10\frac{1}{2}$ months) would be 11,850 and the annual increase according to the arithmetical method would be

$$\frac{61,850-50,000}{9\frac{21}{24}}, \text{ or } 1,200$$

If it is desired to estimate the population as of July 1, 1906, for the purpose of calculating annual rates, this is done by adding to the population as it existed June 1, 1900, the sum of 1,200 for each year intervening between the date of enumeration (June 1, 1900) and the date for which the estimate is to be made (July 1, 1906). There being 6 years and 1 month between these dates, the calculation would be

$$50,000+(6\tfrac{1}{12}\times 1,200)=57,300.$$

This same annual increase is also assumed to occur until the next census shall have been taken, so that if it is desired to estimate the population for July 1, 1914, take the population at the preceding census (Apr. 15, 1910) and add 1,200 for each year intervening between its enumeration and the date for which an estimate is desired (July 1, 1914). There being 4 years and $2\frac{1}{2}$ months between these dates, the calculation would be

$$61,850+(4\tfrac{5}{24}\times 1,200)=66,900.$$

This method assumes the same amount of increase each year and is analogous to the calculation of simple interest. It does not take into account the fact that with the annual increase in population the

number of persons of marriageable age and therefore the number of married persons will be greater each year and consequently the number of births. The growth due to natural increase (the excess of births over deaths) is analogous to the increment of compound interest, and where this factor (the natural increase) is the principal one affecting the population growth estimates of population made by the arithmetical method are unsatisfactory, and especially so where the estimate is made for a date several years away from a census enumeration. Where the excess of births over deaths is the controlling factor in population growth the geometrical method of mak-

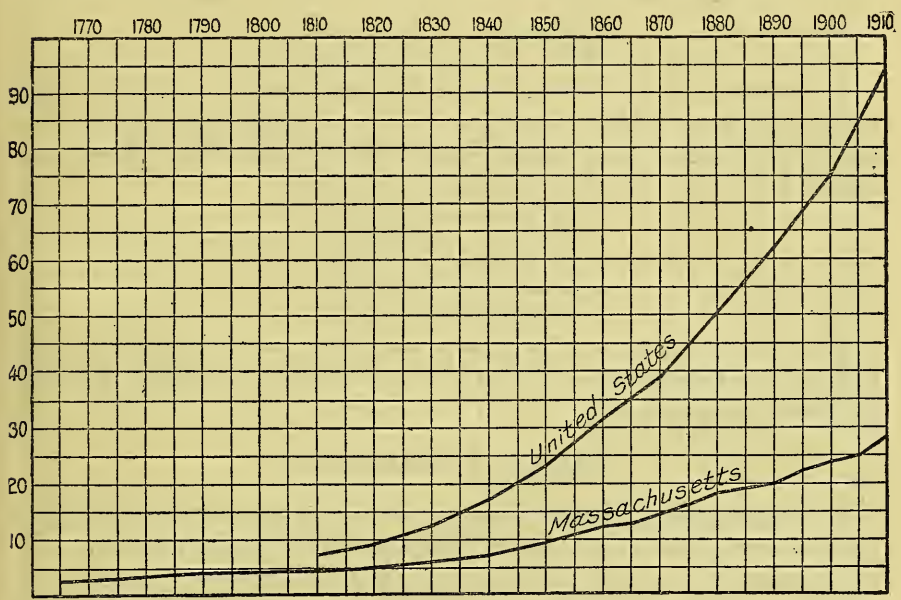

CHART 1.—Population of the United States, in millions, 1810 to 1910; and of Massachusetts, in hundred thousands, 1765 to 1910.

ing estimates, being based on the principle of compound interest, is more accurate. Where the chief factor in population change is migration, or where the relative importance of natural increase is much affected by migration, the arithmetical method may be the more accurate. The arithmetical method has been the one found most reliable in the United States and is the method used by the Bureau of the Census. The method best adapted to a given population can be ascertained by taking the last two intercensal periods and finding whether the rate of increase during the last intercensal period was, when based upon the increase during the preceding intercensal period, at the rate indicated by the arithmetical or the geometrical method.

Geometrical method.—As previously stated, the geometrical method is based upon the principle of compound interest.

Assuming a decennial census, let

P = population in 1900.
P' = population in 1910.
r = the annual increase per unit of population.

Then the population would be—

$$\text{In } 1901 = P\ (1+r)$$
$$\text{In } 1902 = P\ (1+r)^2$$
$$\text{In } 1903 = P\ (1+r)^3$$
$$\text{In } 1910\ (P') = P\ (1+r)^{10}$$
$$\frac{P'}{P} = (1+r)^{10}$$
$$\sqrt[10]{\frac{P'}{P}} = 1+r \text{ and } r = \sqrt[10]{\frac{P'}{P}} - 1$$

In practice the calculation would be made with the aid of a table of logarithms, and given the value of r the estimated population for any intercensal or post censal date is readily obtained. For post censal dates the estimated population would be—

$$\text{In } 1911 = P'\ (1+r)$$
$$\text{In } 1912 = P'\ (1+r)^2$$
$$\text{In } 1913 = P'\ (1+r)^3$$
$$n^{th} \text{ year} = P'\ (1+r)^n$$

The registrar general of England and Wales uses the geometrical method for England and Wales as a whole and a modified method for lesser subdivisions.

MARRIAGE STATISTICS.

Marriage statistics are of interest because of the information they give regarding the social life of the people and the establishment of families and households, and because of the relation of marriages to population growth through their influence on the birth rate. Their consideration naturally precedes that of birth statistics.

The data for marriage statistics are obtained by the registration of marriages. The common custom in the United States is to require persons desiring to marry to obtain first a license from a designated official. This license is presented to whoever performs the marriage ceremony. The person officiating is required to register the marriage. Those responsible for the completeness of marriage records are therefore in this country usually the clergy and justices of the peace. There is seldom much difficulty in securing complete records of marriages, and the amount and value of the information given by marriage statistics depend upon the nature and extent of the facts recorded relating to the contracting parties.

In England and Wales marriage statistics are compiled by the registrar general of marriages, births, and deaths. In this country

the official responsible for the compilation of marriage records varies in the several States. The United States Bureau of the Census has compiled statistics of marriage and divorce in the United States from 1867 to 1906. These were published in 1909.

Marriage rates.—Marriage rates may be expressed as the number of marriages for each 1,000 population. While this method gives certain information of a definite character and is useful for comparing different years of the same community and different communities of similar population composition, it is not useful in comparing populations in which the proportion of single persons of marriageable age is not the same. For the purpose of comparing marriage rates, therefore, the more exact method is to express the rate as the number of marriages or persons married for each 1,000 unmarried, divorced, and widowed, of marriageable age, usually those over 15 years of age.

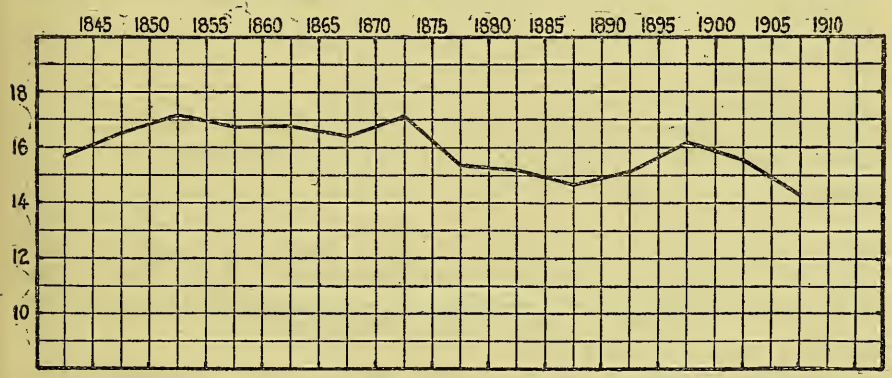

CHART 2.—Number of persons married per 1,000 population per annum—England and Wales—1840 to 1910. The curve shows the mean annual rate for quinquennial periods.

Factors influencing marriage rates.—Marriage rates are usually influenced by economic conditions. National prosperity increases the rate, economic depression reduces it. For the same reasons it is influenced by the demand for labor and the rate of wages. The relation of the adopted standard of living to the average wage has a similar effect. In the absence of other factors, the marriage rate is usually a fair index of the relation of average income to standard of living.

The marriage rate may also be affected by the frequency of divorce and remarriage. A high birth rate tends to increase the marriage rate in succeeding years. In communities such as mining towns and new industrial centers the marriage rate may be limited by the presence of a relatively small number of marriageable women.

The marriage rate in a city may be fictitiously high, due to the fact that many couples from the surrounding country and small towns may go there for the purpose of being married, returning then

to their homes. In a country affected by emigration a relatively large proportion of the migrants are apt to be young men and women,

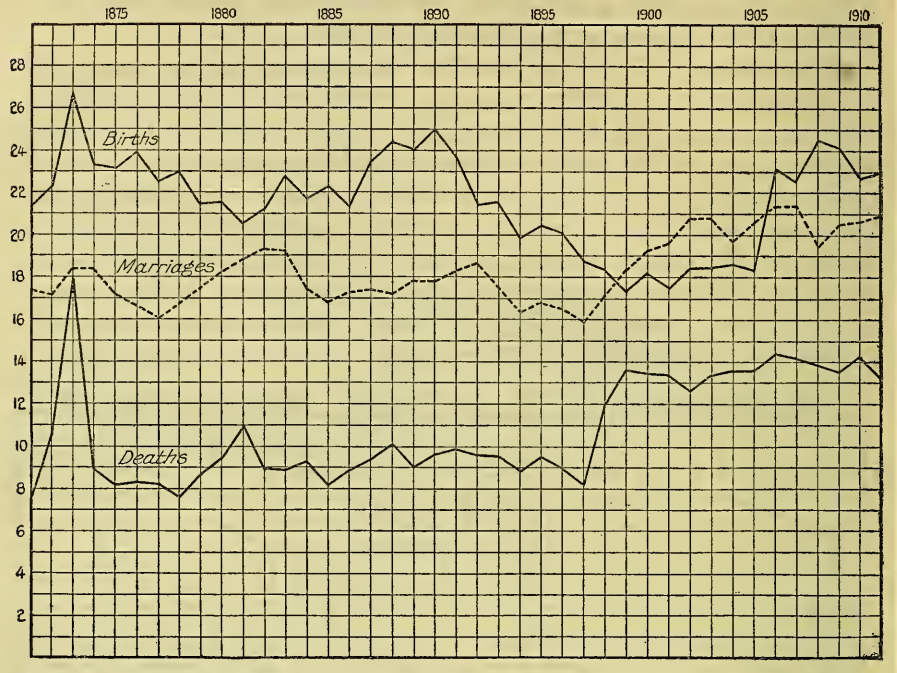

CHART 3.—Births (including stillbirths), persons married, and deaths (excluding stillbirths) registered per 1,000 population per annum—Michigan—1871 to 1911.

the women frequently following after the men have become located. This naturally affects the marriage rate of the home country.

TABLE 2.—*Number of persons married per 1,000 population in certain countries, 1892 and 1911.*[1]

Country or State.	1892	1911
Australian Commonwealth	13.5	17.6
Austria	15.7	15.2
Denmark	13.5	14.4
England and Wales	15.4	15.2
Finland	12.2	12.0
France	15.1	15.5
German Empire	15.9	15.7
Hungary	18.4	18.5
Ireland	9.3	10.7
Italy	14.9	15.0
The Netherlands	14.4	14.3
New Zealand	12.5	17.4
Norway	12.7	12.5
Roumania	15.4	21.0
Scotland	14.1	13.4
Servia	19.0	20.6
Spain	16.9	14.2
Sweden	11.4	11.7
Connecticut	.....	18.8
Massachusetts	18.0	18.6
Michigan	18.6	20.9

[1] Taken from the Seventy-fourth Annual Report of the Registrar General of Births, Deaths, and Marriages in England and Wales, 1911, except the rates for Massachusetts, Michigan, and Connecticut, which were taken from the State reports.

Uses of marriage registration.—The purpose of the registration of a marriage is largely to protect the home and family. It furnishes reliable evidence upon which to base the legitimacy of children and the dower rights of women.

BIRTH STATISTICS.

Statistics of births are of interest mainly because of their relation to population growth, the excess of births over deaths being known as the "natural increase." Growth of population has been the object of concern to nations largely because of its effect in determining the future military strength and the number of men available for purposes of offense and defense. The practically stationary population of France has for some time been the subject of comment, but with her limited territory it is a question whether the people as a whole are not better off with the present population than they would be with a larger one. More people mean greater congestion and more intense competition. During the last century Great Britain, Germany, Austria, and Russia have trebled in population. Had France done the same, she would now have nearly 80 millions of people, and it is doubtful whether this would have added to the happiness and welfare of the race.

It is undoubtedly better to have a people proportionate in number to land area and natural resources than to have a teeming population with the consequent economic problems. It would seem more in keeping with modern ethics to strive for a people composed of intelligent, physically sound individuals free from disease and properly housed, fed, and clothed, whose days furnished time for both labor and recreation under conditions which conduced to physical and mental welfare and not to deterioration, rather than to strive for mere numbers.

To the health officer and sanitarian birth statistics have only casual interest. Birth registration, however, which furnishes the data from which the statistics are made, is important not only in public health work but in other ways as well.

Registration in England.

Registration of baptisms, marriages, and deaths in England dates back to 1538, when Thomas Cromwell, Vicar General under Henry VIII, issued injunctions to all parishes in England and Wales requiring the clergy to enter every Sunday in a book kept for the purpose a record of all baptisms, marriages, and burials of the preceding week.[1] A copy of the order will be found in the appendix, page 71.

[1] "The Parish Registers of England," by J. Charles Cox.

August 24, 1653, Parliament passed an act taking the parochial registers from the clergy and placing them in the custody of laymen called "parish registers" who were to record all marriages, births, and burials. Later this duty reverted to the clergy.

The office of registrar general of births, marriages, and deaths was established in 1836 and pursuant to an act of Parliament civil registration was begun July 1, 1837. In 1870 the registration of births and deaths was made compulsory, with a resulting improvement in the returns.[1]

Registration in the United States.

In legislation the registration of births, marriages, and deaths were formerly usually associated and provided for by the same laws. Since 1900, however, this has not been generally true in the United States, where the practice has developed of providing separately for the registration of births and deaths.

COLONIAL PERIOD.

In 1632 the Grand Assembly of Virginia passed a law requiring a minister or warden from every parish to be present annually at court on the 1st of June and present a register of all burials, christenings, and marriages.

In 1639 Massachusetts Bay colony adopted a requirement for the keeping of records of marriages, births, and deaths.

In 1646 the Plymouth colony enacted a law providing that the clerk or someone in every town should keep a record of all marriages, births, and burials.

In 1692 Massachusetts put the registration of births and deaths on a more definite basis by the enactment of the following law:

CHAPTER 48.

AN ACT FOR THE REGISTERING OF BIRTHS AND DEATHS.

For preventing of great uncertainty and inconvenience that may happen for want of a particular register of births and deaths—

Be it enacted by the Governor, Council and Representatives in General Court assembled, and by the authority of the same, That every town clerk within this province shall be and is hereby impowred and required to take an account of all persons that shall be born, or shall dye, within each town, respectively, and the precincts thereof, and fairly to register in a book their names and surnames, as also the names and surnames of their parents, with the time of their birth and death. And the clerk shall demand and receive the fee of threepence, and no more, for each birth, or death by him so registered, to be paid by the parents or others nextly related to or concerned with the party born or dying. And if any shall refuse or neglect to give notice to the town clerk of the birth or death of any person that they are so related to or concerned for, or to pay for registring as abovesaid by the space of thirty days next after such birth or death, every person so refusing or neglecting, and being (upon the complaint of any town clerk) thereof convicted before a justice of the peace within the same county,

[1] Vital statistics, Newsholme, 1899.

shall forfeit and pay unto such clerk the sum of five shillings, to be levied by distress and sale of the offender's goods by warrant from such justice, if payment thereof be not made within four days next after conviction as aforesaid. And every town clerk shall give forth from the registry a fair certificate, under his hand, of persons born or dying in the town, to any who shall desire the same; and he shall receive sixpence and no more for every certificate so given.

(Passed February 17, 1692–3.)

POSTCOLONIAL PERIOD.

In 1795 Massachusetts passed a law repealing the 1692 act and requiring parents to give notice to the town clerk of births and deaths of children, householders to give notice of those in their households, and persons in charge of institutions of those occurring in their respective institutions. The town clerks were required by the same law to keep a record of all births and deaths coming to their knowledge. In the case of births the date of birth and the names of the parents were to be recorded. A penalty of $1 was provided for failure to report a birth or death.

In 1842 Massachusetts passed the following act providing for the registration of births, marriages, and deaths:

An Act relating to the registry and returns of births, marriages, and deaths.

Be it enacted by the Senate and House of Representatives, in General Court assembled, and by the authority of the same, as follows:

SEC. 1. The clerks of the several towns and cities in the Commonwealth shall, annually, in the month of May, transmit to the secretary of the Commonwealth a certified copy of their record of the births, marriages, and deaths of all persons within their respective towns and cities, which may come to their knowledge; shall state the number of births and marriages, and the number of deaths, with the name, sex, age (and if an adult male, the occupation), and the names of the diseases of which all persons have died, or are supposed to have died, together with the cause or causes of the death of all such deceased persons, so far as they may be able to obtain a knowledge of the same from physicians or others; and any clerk who shall neglect to make such return, shall be liable to a penalty of ten dollars, to be recovered for the use of any town or city where such neglect shall be proved to have existed.

SEC. 2. The secretary of the Commonwealth shall prepare and furnish to the clerks of the several towns and cities in this Commonwealth, blank forms of returns, as herein before specified, and shall accompany the same with such instructions and explanations as may be necessary and useful; and he shall receive said returns, and prepare therefrom such tabular results as will render them of practical utility, and shall make report thereof annually to the legislature, and generally shall do whatever may be required to carry into effect the objects of this act, and of the several provisions of the Revised Statutes not inconsistent with this act. (Approved by the Governor, Mar. 3, 1842.)

In 1844 Massachusetts passed another law amplifying the preceding and requiring the town clerks to number the births registered and to record them in the order in which received, showing in separate columns the date of birth, place of birth, name of child, sex of child, name and surname of one or both parents, occupation of father, residence of parents, and the time of making the record. Marriages

were also required to be numbered and recorded in the order received, the record to show the date and place of marriage; the name, residence, and official station of the person performing the ceremony; the names and surnames of the contracting parties and the residence, age, civil status, occupation, and the names of the parents of each; and the time when the record was made. Deaths were likewise to be numbered and recorded in the order received, the records to show the date of death; the name, surname, sex, civil (marital) status, age, occupation, place of death, place of birth, and names of parents of the decedent; the cause of death; and the time the record was made.

The school committee of each town and city was to ascertain annually in May the births which had occurred during the preceding year and to report them with all required data to the town clerk. Persons solemnizing marriages were to keep proper records and make returns to the town clerks once a month. Sextons or other persons having charge of burial grounds were to keep records of burials and make returns monthly to the town clerk.

The law of 1844 placed the responsibility for the registration of births upon the school committee, for the registration of marriages upon the persons officiating, and for the registration of deaths upon persons in charge of burial grounds.

Most of the other States have from time to time passed laws requiring the registration of births. Many of these laws have been faulty and incapable of enforcement. The returns have also suffered in most instances from the absence of particular efforts at enforcement, so that in very few localities have the records been at all complete.

RECENT DEVELOPMENT.

The American Medical Association has for many years taken cognizance of the need for improved registration of births, marriages, and deaths. As early as 1846 a committee was appointed to consider ways and means for improving the registration of births, marriages, and deaths. In 1855 the following resolutions were adopted by the association:

Resolved, That the members of the medical profession throughout the Union be urgently requested to take immediate and concerted action for petitioning their several legislative bodies to establish offices for the collection of vital statistics.

Resolved, That a committee of one from each State be appointed to report upon a uniform system of registration of marriages, births, and deaths.

Of recent years merited attention has been given to the subject of birth registration by the Bureau of the Census, the American Public Health Association, the American Medical Association, and other similar bodies. The recently established Children's Bureau of the Federal Government has, since its organization, been especially active in urging the need of better registration.

A model bill for the registration of births and deaths recommended for enactment by the several State legislatures has been drafted and indorsed by the American Medical Association in consultation with representatives of the Bureau of the Census, the Children's Bureau, the American Public Health Association, the American Bar Association, and a number of other organizations and societies national in scope. (For copy of model bill see appendix, pp. 83–92.) The essential features of this law have been adopted by a number of States. It is important that other States should also enact it, for it is without question as effective a law as any that has been proposed for adoption in this country. It is also highly desirable that the laws of the several States on the subject be uniform, if the Bureau of the Census is to compile the records for statistical purposes. The power to legislate on such matters resides with the individual States. The only means the Bureau of the Census has of preparing national birth statistics is to compile the records registered in the several States under State laws. This is done by making copies of the birth certificates registered in the various States and from these copies taking the data for statistical tabulations. The adoption of a uniform law would therefore have distinct advantages, even if it were possible for State legislatures individually to draft better ones.

Source of data.—While the data from which population statistics are derived are obtained by direct enumeration, the data from which birth statistics are compiled are gotten by registration. The usual requirement is that whenever a child is born either the attending physician or midwife, or, in their absence, the parents or the head of the household in which the birth occurred, shall register with an official designated for the purpose certain information regarding the child and its parents.

Nature of information secured by registration.—The information required to be registered concerning each child born usually includes certain facts relating to the child and the circumstances of its birth, together with certain items concerning the parents. The essential facts are the name of the child, its sex, date and place of birth, and whether born alive or stillborn, and the names and residence of the parents. There are many other items of information concerning births which are of the greatest value and serve various purposes, such as the age, color, nativity, and occupation of the parents, whether the child is a single birth, a twin, or triplet, and whether legitimate or illegitimate. These facts are usually required to be stated.

The items registered serve two principal purposes. They serve, first, to identify the child and to establish its age and parentage, and, second, to furnish statistical data.

While in the enumeration of the population the original observer, upon the accuracy of whose work population statistics largely depend, is the census enumerator; in birth registration the original observer, upon whom dependence must be placed, is usually the physician attending at the birth, sometimes the midwife, and in the absence of these the parents.

Births are usually required to be registered with an official appointed for the purpose and known as a registrar. Customarily it is the same official with whom deaths are registered. Not uncommonly a small fee is paid to the person making the registration or filling out the certificate. This custom, however, is likely to create in the minds of many the idea that the registration is a matter of discretion—that if the fee is not wanted there is no compulsion to file the certificate and that the forfeiting of the fee annuls the obligation. This is especially true in the United States, where physicians and midwives have in many instances not yet come to realize that the importance of proper registration may mean so much to the child and its parents that no accoucheur has completed his task nor fulfilled his obligations to the child and its mother until an accurately filled out certificate has been filed with the registrar. The failure to file such a certificate is such a neglect of the interests of both patients, the child and the mother, that it would seem proper to class it as malpractice.

Standard birth certificate for United States.—The standard form of birth certificate approved by the Bureau of the Census and recommended for use in the United States appears on page 93 of the appendix. The dimensions of the certificate as used are $6\frac{1}{2}$ by $7\frac{7}{8}$ inches.

Frequently the child is not named until some time after birth, so that it is impossible to insert in the certificate the full name of the infant. To meet this difficulty the Bureau of the Census recommends the use of a "supplemental report of birth" which is to be filled in after the child has been named and filed with the registrar, who attaches it to the original certificate. See Appendix, p. 93.

Birth Rates.

There are several ways of expressing the birth rate. Each method of statement gives information not given by the others.

Rate per 1,000 population.—The birth rate may be expressed as the number of births occurring during a year for each 1,000 of the population. This is known as the crude birth rate, and is based upon the total estimated mean population for the year—that is, for the calendar year, the population estimated as of July 1. The crude birth rate shows the net result to the community of the several factors governing reproduction—the number of women of child-bearing age, the number of those who are married, the frequency of illegitimacy, etc. In con-

junction with the crude death rate it shows the ratio at which the community is reproducing itself by natural increase. It is a quite satisfactory basis for comparing the birth rate of different years for the same community or that of different communities having populations of similar composition. It is unsatisfactory for the comparison of populations having different proportions of females of child-bearing age or of married women—a mining town or new industrial center may have comparatively few women; a fashionable residential district

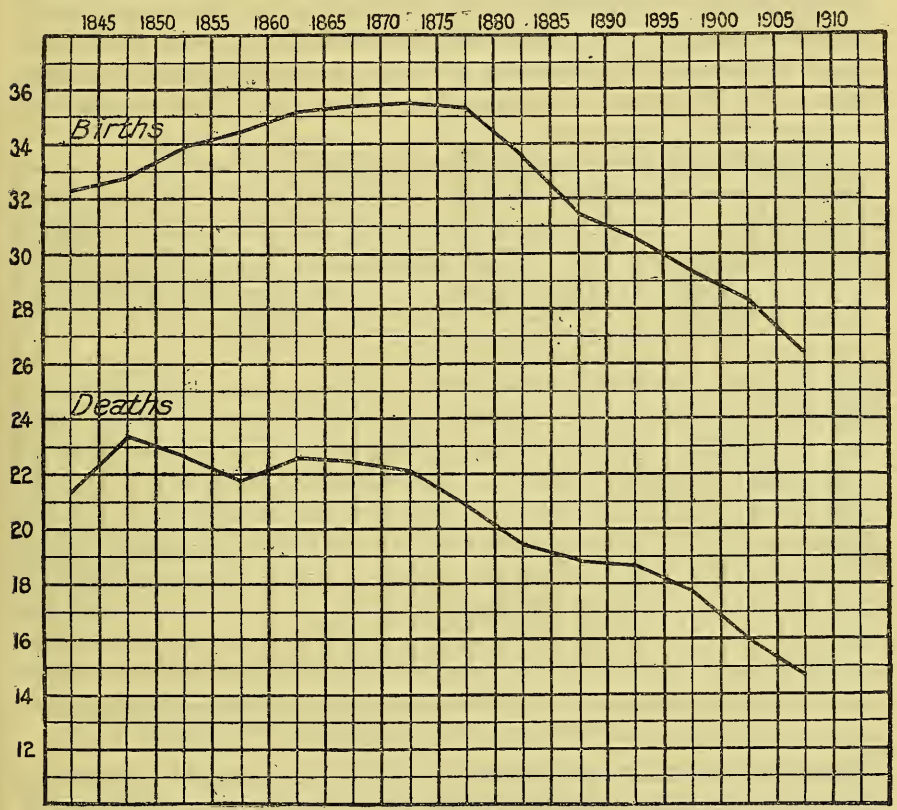

CHART 4.—Births and deaths (exclusive of stillbirths) per 1,000 population per annum—England and Wales—1840 to 1910. The curve shows the mean annual rates for quinquennial periods.

may have a relatively large female population, most of which consists of unmarried servants.

Rate per 1,000 women of child-bearing age.—Birth rates may be expressed as the number of births occurring during the year per 1,000 women of child-bearing age. For this purpose the female population between the ages of 15 and 45 years as determined by census enumeration, or by estimation for intercensal and post censal years, is taken. The proportion of women of these ages in the population having been ascertained by a census, the same relative proportion is assumed to be maintained until a succeeding census shows a change.

This method gives rates that furnish a much better basis for the comparison of different communities, in as much as it gives the births in proportion to the number of potential mothers. It is not, however, satisfactory under all conditions, and the method next described yields more useful information.

Rate of legitimate births per 1,000 married women of child-bearing age (15 to 44 or 15 to 49 years of age) and of illegitimate births per 1,000 unmarried women of child-bearing age.—In different communities the proportion of married and single women may differ considerably and consequently comparison of their crude birth rates or of rates based on the number of women of child-bearing age would yield comparatively little useful information. The proportion of married

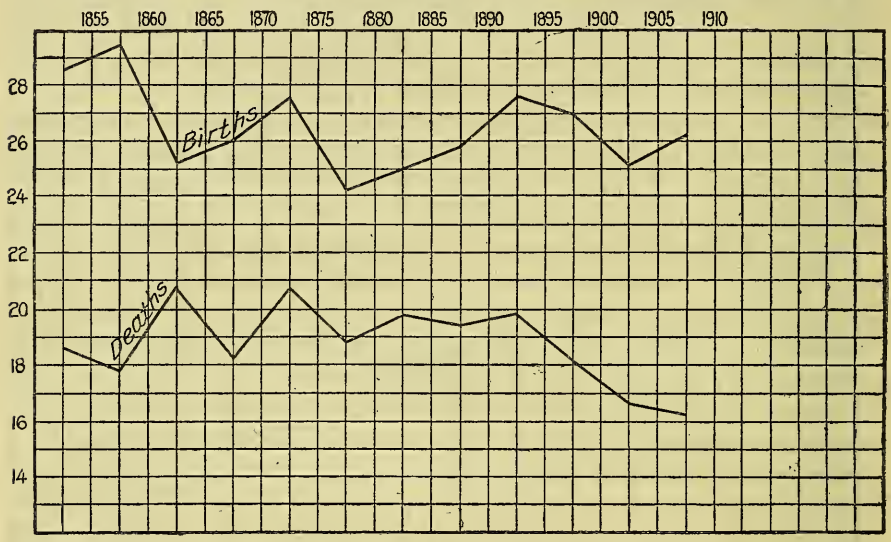

CHART 5.—Births and deaths (exclusive of stillbirths) per 1,000 population per annum—Massachusetts—1850 to 1910. The curve shows the mean annual rate for quinquennial periods.

women in industrial communities is usually considerably larger than it is in residential suburbs, where there are greater numbers of female servants. To make allowance for these differences in population composition the most useful method of stating the birth rate is in terms of the number of legitimate births per 1,000 married women of child-bearing age (15 to 44 years or 15 to 49 years) and the number of illegitimate births per 1,000 unmarried women of this age.

Sources of Error in Birth Statistics.

The principal sources of error in birth statistics are to be found in defective registration. There is no reliable check by which the failure to register births can in all cases be detected. In many foreign countries the people have become accustomed to register births and apparently their returns are quite complete. The registration of

illegitimate births, however, is always less complete than that of the legitimate. In the United States the people, as a whole, have in most sections not become accustomed to the registration of births. This is undoubtedly due in part to a rapidly changing population continually receiving large numbers of immigrants from various foreign countries—immigrants who are ignorant of our registration laws and have little opportunity of learning their requirements—and in part to the absence of effort by the authorities to enforce the laws.

As checks upon the completeness of birth registration registrars frequently use the death returns of young children and especially of infants, checking up each recorded death with the birth records to see whether the birth of the child had been registered. The notices of births appearing in newspapers are also often used for the same purpose. If in cities dealers were required to keep a record of all sales of baby carriages, cribs, and high chairs this might be of use as a further check until the population shall have become thoroughly used to registration. Also, if all christenings were required to be notified by those officiating, this too would be of assistance.

Uses of Birth Registration and Statistics.

Birth statistics are of use in ascertaining the natural increase of the population (excess of births over deaths). They also give valuable information regarding the effective fertility or fecundity of the race and of the frequency of illegitimacy. These matters are of interest to the economist and the statesman. The possession of birth statistics also furnishes the basis for the present accepted means of stating the infant mortality rate, as will be explained later. The data from which the statistics are made, the registered births, are on the other hand of value to the community in many ways, and to the health officer among others may be especially useful. Some of the uses will be enumerated.

Legal record.—The registration of a child's birth forms a legal record that is frequently useful and may be of the greatest importance. It establishes the date of birth and the child's parentage and legitimacy. It may be required to establish the child's age for attendance at public schools, for permission to work in States where children below a certain age are not allowed by law to be employed; to show whether a girl has reached the age of consent, whether individuals have attained the age when they may marry without the parent's permission; to establish age in connection with the granting of pensions, military and jury duty, and voting. It may be necessary in connection with the bequeathing and inheritance of property or to furnish acceptable evidence of genealogy, and in fact may be important and useful in possible events too numerous to mention.

Uses in public health administration.—Registration of births shows where the babies are and makes possible such observance and protec-

tion as the health department desires to extend. With birth registration it would be possible for the health authorities to see that the babies are vaccinated against smallpox. This is one of the uses made of registration in England. It would also be possible to see that the babies in poor families have proper food and adequate attention. The observation of infants under 2 weeks of age would bring to light some cases of ophthalmia which otherwise might cause serious injury to vision and at times total blindness.

TABLE 3.—*Birth rates (exclusive of stillbirths) per 1,000 population in certain countries, 1886 and 1911.*[1]

Country or State.	1886	1911
Australian Commonwealth	35.4	27.2
Austria	38.3	31.4
Denmark	32.4	26.8
England and Wales	32.8	24.4
Finland	35.3	29.1
France	23.9	18.7
German Empire	37.0	28.6
Hungary	45.6	35.0
Ireland	23.2	23.2
Italy	37.0	31.5
The Netherlands	34.6	27.8
New Zealand	33.1	26.0
Norway	31.2	25.9
Roumania	42.2	43.0
Scotland	32.9	25.6
Servia	42.0	36.2
Spain	36.7	31.2
Sweden	29.8	23.8
Connecticut	[2] 22.2	24.8
Massachusetts	25.4	25.7
Michigan	[2] 21.3	23.0

[1] Taken from the Seventy-fourth Annual Report of the Registrar General of Births, Deaths, and Marriages in England and Wales, 1911, except the rates for Connecticut, Massachusetts, and Michigan, which were taken from the State reports.
[2] Includes stillbirths.

Factors Influencing Birth Rates.

Birth rates are directly influenced by the number of women, and particularly of married women, of child-bearing age in the population. The child-bearing period of life for women may be considered as that between the ages of 15 and 49 years; the ages between 25 and 44 years are for most races of the north temperate zones, however, those mainly productive.

The economic and social status of the population may also affect the birth rate. In many countries at present the poorer families have considerably more children per family than have the well-to-do; in fact to some extent the number of children per marriage seems to be inversely as the family income. On the other hand, to a degree poor economic conditions are liable to discourage or delay marriage, so that married couples are relatively fewer and older when married, with fewer resulting offspring. The adoption of a more expensive standard of living may produce the same results as depressed economic conditions, fewer and delayed marriages.

The birth rate is also affected by the habits and customs of the people, by their desire to have children or their desire not to have them. Also a high infant death rate is usually accompanied by a high birth rate and, conversely, a low infant death rate by a low birth rate.

MORBIDITY STATISTICS.

Morbidity statistics are the statistics of sickness and disease. They show the occurrence of diseases and their relative prevalence in different localities and at different times. They differ from mortality statistics in that as relates to disease, mortality statistics are the statistics of fatal cases only, while morbidity statistics include all cases.

In the life of the individual, after birth the next event included in vital statistics which usually occurs is sickness. Disease has perhaps a greater influence in determining the happiness and efficiency of the individual and of the community than any other factor. It also has a direct bearing on the individual's longevity even when in itself not fatal, for every attack of sickness probably does some injury and leaves the human machine impaired to a degree.

In speaking of the usefulness of morbidity registration, Farr has said:

> It will be an invaluable contribution to therapeutics, as well as to hygiene, for it will enable the therapeutists to determine the duration and the fatality of all forms of disease under the several existing systems of treatment in the various sanitary and social conditions of the people. Illusion will be dispelled, quackery, as completely as astrology, suppressed, a science of therapeutics created, suffering diminished, life shielded from many dangers.[1]

Morbidity statistics have not evolved apace with those of births, marriages, and deaths. This is due to the different purposes they serve. The branches which have to do directly with the growth of population were first developed, probably because of the need of the information which they gave in connection with taxation and military enlistment. Morbidity statistics, on the other hand, are contemporary with our comparatively recently acquired knowledge of the causes of diseases and their manner of spread. Their need has been felt only with the advent of present day public health administration, which in turn has been activated in large measure by the story of the causes of death told by mortality statistics.

Morbidity statistics had their origin in the requirement of the notification of cases of certain dreaded diseases, notably smallpox. With the appointment of health officers and the establishment of health departments the notification of other diseases has been required. As knowledge of the causes of diseases and their manner of spread has been obtained and health departments have been faced with the respon-

[1] Cited by Newsholme, Vital Statistics, 1899.

sibility of controlling maladies found to be preventable, the list of notifiable diseases has grown, for those responsible for public health administration have found that it is impossible to effectively control a disease without prompt information of when, where, and under what conditions cases of the disease are occurring. No epidemiologist would think of attempting to control an outbreak of yellow fever or cholera without inaugurating a dependable system whereby he would receive prompt and accurate information of the occurrence of cases. It is just as impossible to effectively control tuberculosis, typhoid fever, scarlet fever, industrial lead poisoning, or any other preventable disease without a knowledge of the occurrence of cases.

The requirements for notification of the preventable diseases and the extent of their enforcement may be taken as an index of the intelligence and efficiency of health administration in a community.

Morbidity Statistics in England and Wales.

In England beginning with the year 1911 the medical officer of the local government board has compiled statistics of the incidence of the diseases notifiable in England and Wales. These diseases are smallpox, typhus fever, scarlet fever, diphtheria, typhoid fever, puerperal fever, erysipelas, plague, cholera, relapsing fever, tuberculosis, pulmonary tuberculosis (added Jan. 1, 1912, all forms made notifiable Feb. 1, 1913), cerebrospinal fever (added Sept. 1, 1912), and acute poliomyelitis (added Sept. 1, 1912). The local sanitary officers are required by a general order of the local government board, promulgated December 13, 1910, to transmit to the medical officer of the board each Monday a statement of the cases notified to them during the preceding week. The medical officer of the local government board is the chief sanitary officer for England. Statistics of births, marriages, and deaths, on the other hand, are compiled in the office of the registrar general.

The experience leading to the present system for morbidity reports in England and Wales was similar to that through which the United States is now passing. Soon after the establishment of the civil registration of deaths in England in 1837 it became evident that a record of fatal cases (deaths) only did not give the kind of information necessary for the control of disease and that sanitary officials must have knowledge of the occurrence of the nonfatal as well as of the fatal cases, and that this information should be received early in the course of the disease, for when received after the termination of the case it has little other than statistical value. Various men, societies, and associations advocated at different times plans for the notification of sickness throughout the country. The British Medical Association as far back as 1865 made repeated efforts to have adopted a uniform system for morbidity reports.

Morbidity Statistics in Russia.

In Russia sanitary regulations adopted in 1905 require that all physicians, whether engaged in private practice or in Government service, shall forward to the local sanitary inspector having jurisdiction a monthly report of patients treated by them both in private practice and in hospitals, the reports for the patients in private practice and those in hospitals to be made separately. In addition to this every case of infectious disease is to be reported at once. A heavy penalty is imposed for failing to report. Every hospital and clinic is also required to keep a detailed record of its patients and report regularly to the sanitary inspectors. The data received by the local sanitary officials in the monthly reports from hospitals and practitioners are compiled and forwarded annually to the chief sanitary inspector of the ministry of the interior on forms printed for the purpose. The chief sanitary inspector at St. Petersburg compiles these reports of the occurrence of sickness throughout the empire and publishes them annually.

The sickness records for Russia include all parts of the empire. Among the infectious diseases for which morbidity statistics are compiled are smallpox, scarlet fever, diphtheria, measles, whooping cough, influenza, typhus fever, typhoid fever, dysentery, cholera nostras, Asiatic cholera, epidemic gastroenteritis, mumps, erysipelas, septicemia and pyemia, rheumatic fever, croupous pneumonia, tuberculosis, malaria, scabies, trachoma, syphilis, soft chancre and gonorrhea. Statistics are also compiled for mental diseases, traumatic affections, and vaccinations for smallpox.

Morbidity Statistics in the United States.

Advocated by American Medical Association and others.—The need of having information of the prevalence and geographic distribution of diseases has been realized by physicians in the United States for many years, and the subject has repeatedly come before the American Medical Association in one form or another. At the meeting in 1855 the following resolution offered by Dr. J. W. Thomson was adopted:

> Whereas few subjects of greater interest and importance could be presented to the consideration of the American Medical Association, now representing most of the States and Territories of the Union, than the attainment of a correct medical topography of each, with a history of its prevailing diseases, and most successful treatment of the same: Therefore be it
>
> *Resolved*, That with this view and conviction, this association appoint a special committee for each State and Territory represented, of ——— members, whose duty it shall be to report upon its medical topography, epidemic diseases, and the most successful treatment thereof, and that the same shall continue to hold their office for three years.

Resolved, That as other States and Territories, not now represented, become so by delegates duly appointed to this national association, similar committees shall be appointed for like purposes, and that they also shall hold their office for three years.

Resolved, That in the appointment of gentlemen of education and experience in the affairs of their own State, we have the best guarantee that the important objects we seek will be more satisfactorily accomplished, and the profession as well as the public interest thereby better served.

Resolved, That the committees heretofore appointed by this association at its session in Charleston for a similar object be, and the same are hereby, discharged.

At this same meeting Dr. J. G. Orton introduced a resolution supplementing the preceding. The resolution, which appears not to have been adopted, was in part as follows:

Resolved, That each county medical society, or (in parts of the country where such has not been established), any duly organized medical association, be requested to amend its constitution by attaching thereunto the following article:

"It shall be the duty of each member of this society to keep a faithful record of the diseases which may fall under his observation during each month, according to the classification adopted by this convention in May, 1847, stating the age and sex, occupation and nativity of the patient, the average duration of the disease, and finally, their recovery or death, and to report the same in writing to the secretary, on or before the first day of February of each year, who shall transmit a digest thereof to the State Medical Society and also to the appropriate committee appointed by the American Medical Association for its reception."

Resolved, That each incorporated hospital, infirmary, and asylum be invited to furnish a copy of their annual reports for the use of the committees of their respective States.

Resolved, That the State committees appointed by this association to report on the prevailing diseases of their respective localities, shall receive and arrange a digest of the reports transmitted to them by the secretaries of the various county societies, and report the same at the annual meeting of this association.

In 1859, Dr. W. C. Rogers, in an address on "The registration of diseases"[1] stated: "The necessity for a system of registration has long been felt." He then cites the following quotation from an editorial in the British Medical Almanac of 1837:

The first step in medical statistics, after having determined the mortality, is to ascertain the number of attacks of sickness at different ages, to which a population is liable, and the numbers constantly ill.

First developed in Massachusetts.—In 1874 the State Board of Health of Massachusetts inaugurated a plan for the weekly voluntary notification of prevalent diseases. A letter was sent in November, 1874, to 168 physicians in the State, asking them to report weekly. One hundred and fifteen physicians agreed to do so. In 1875, 79 additional physicians agreed to report. The letter soliciting the assistance of the physicians is of special interest because it

[1] Transactions Medical Society State of New York, 1859, p. 202.

represents one of the earliest and most important steps in the systematic collection of morbidity reports. The letter follows:

COMMONWEALTH OF MASSACHUSETTS,
STATE BOARD OF HEALTH,
Boston, November 1, 1874.

DEAR SIR: The State board of health is very desirous of getting weekly information of the diseases prevalent in all parts of Massachusetts. The object is certainly one of great importance—positive knowledge of the health of the people, as well as of the diseases which, at any time and place, are present, or which threaten to extend as epidemics.

In order, however, to attain this end the board will need the cooperation of a large and select number of physicians, in full general practice, in various parts of the State. We, therefore, take the liberty of asking whether you will consent to be one of this number—to report weekly during the next year (1875) the diseases prevalent in your vicinity. The inclosed sample postal card will indicate the proposed method; it will be observed that an endeavor has been made to reduce to the minimum the expenditure of time and trouble incident to the service asked of busy medical men.

The board has appointed Dr. F. W. Draper, of Boston, to be the registrar of this new bureau of health correspondence. He will compile from the returns received a concise weekly bulletin of prevalent diseases to be reported to the secretary of the board, and published, with appropriate comments, for the information of the people. At the end of the year a summary of the accumulated observations will be prepared for publication in the annual report of the board.

If the board is successful in securing the cooperation of physicians in the accomplishment of this plan, the practical results will be of essential value not only to the State at large, but to private individuals. To medical men, in particular, such a weekly synopsis of prevalent diseases would be possessed of obvious interest. It is not out of place to remark also that the present scheme is the first practical attempt in any part of the world to make a systematic weekly registration of diseases. It is hoped that you will consent to assist the board in executing a purpose which is capable of being developed to very useful ends. If you will please to signify your willingness to undertake the service alluded to, the proper blanks will be forwarded.

We have the honor to be, very respectfully, yours,

HENRY I. BOWDITCH,
DAVID L. WEBSTER,
J. C. HOADLEY,
RICHARD FROTHINGHAM,
T. B. NEWHALL,
R. T. DAVIS,
CHAS. F. FOLSOM,
Members of the State Board of Health.

The information called for by the postal card form referred to and its typographical arrangement are shown by the following reproduction:

MASSACHUSETTS REPORT CARD, 1874.

Report of diseases prevalent during the week ending Saturday, ..., 1875.

		Mild.	Severe.
Please erase the names of diseases not prevalent, and indicate the relative gravity of prevalent diseases by a cross (X) under "Mild" or "Severe," as the case may be; basing the report, not alone on the actual cases in the reporter's practice, but also on a general knowledge concerning his vicinity. Please mail the card as soon after Friday of each week as convenient.	Bronchitis.....		
	Cholera Infantum.....		
	Cholera Morbus.....		
	Croup (Membraneous).....		
	Diphtheria.....		
	Diarrhoea.....		
	Dysentery.....		
	Influenza.....		
	Measles.....		
	Pneumonia.....		
	Rheumatism.....		
	Scarlatina.....		
	Small-pox.....		
	Typhoid Fever.....		
	Whooping-cough		
	.....		
	.....		
	.....		

Remarks.....

.....

.....

.....M. D.

Dr. F. W. Draper was placed in charge of the work and made registrar of the bureau of health correspondence. The opening paragraphs of his first report were as follows:

The desirability of a trustworthy method for the registration of prevalent diseases is undisputed. Sanitarians have repeatedly expressed the want, but have failed hitherto to realize its fulfilment. They know how much greater would be their power to protect the public health if data of the local development and progress of disease were promptly afforded to them. They recognize the fact that the utility of such a registration is amply illustrated in the control which boards of health exercise during invasions of smallpox, prompt measures of prevention by isolation being thereby made possible for the defense of the entire community. In a still broader sense, they see the great advantage which would result from the opportunity to study the rise and fall of epidemics, and the development of diseases whose cause lies in local and preventable conditions.

Hitherto health authorities have relied on the registration of deaths as affording a basis for their active operations in behalf of the public welfare, as well as for generalizations in sanitary science. A persistently high rate of mortality is an indication that something is wrong in the sanitary condition of the community reporting it; it is a signal that so far as that region is concerned, influences are at work which demand speedy investigation and, if it be possible, prompt removal. Therefore the registration of mortality has always been acknowledged as an invaluable adjuvant to sanitary administration.

But it is obvious that the death rate does not represent the actual state of the public health, the real amount of sickness, or its real character at any given time in any community. An entire hamlet may be smitten by an epidemic which makes no impression on the bills of mortality. The schools of a township may be forced to take an unseasonable vacation by a general invasion of whooping cough, which may cause

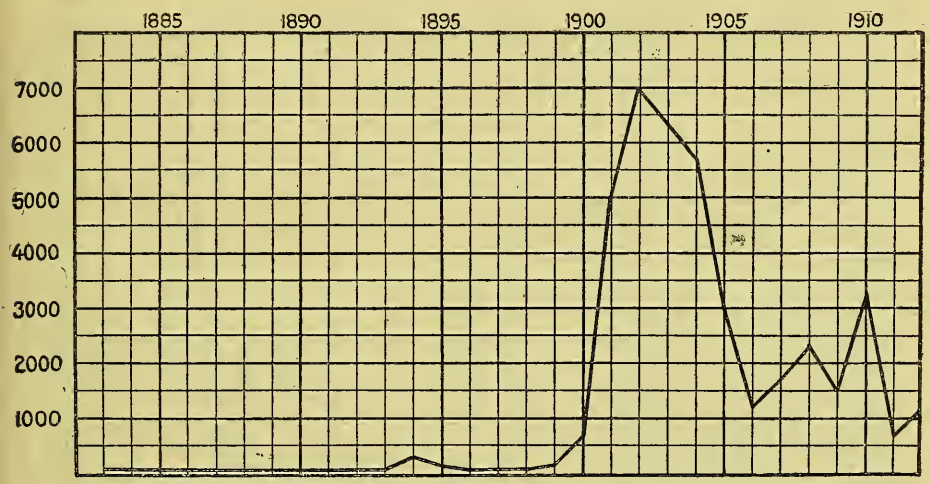

CHART 6.—Smallpox—Number of cases notified per annum in Michigan from 1883 to 1912.

a comparatively small number of deaths. Mild scarlatina, or diphtheria, or even smallpox may sweep through a village and be the occasion of only a few funerals. On the other hand, an exceptionally severe outbreak of infectious diseases may be attended with a fatality out of all proportion to the number sick, and thus become the source of erroneous inferences. So that it seems eminently desirable that a registration of diseases should in some way be put into operation, not to take the place of mortality registration, but to supplement it.

Massachusetts and Michigan were pioneers in the collection of information regarding the prevalence of disease.

In 1884 Massachusetts passed a law requiring householders and physicians to report immediately to the selectmen or board of health of the town all cases of "smallpox, diphtheria, scarlet fever, or any other disease dangerous to the public health." Penalty for failure on the part of the householder was made a fine not exceeding $100. The penalty for failure of physicians was a fine of not less than $50 nor more than $200.

Early development in Michigan.—The plan which the Massachusetts State Board of Health adopted in 1874 of furnishing postal-card blanks to voluntary correspondents for the purpose of collecting weekly information of the prevalence of disease was adopted by the Michigan State Board of Health in 1876. In its annual report for the year the State board of health in referring to the matter states "A knowledge of the nature and extent of prevalence of at least the several prominent diseases throughout the State has from the first organization of the board been considered desirable."

In 1883 Michigan passed a law requiring householders, hotel keepers, keepers of boarding houses, or tenants, to report immediately

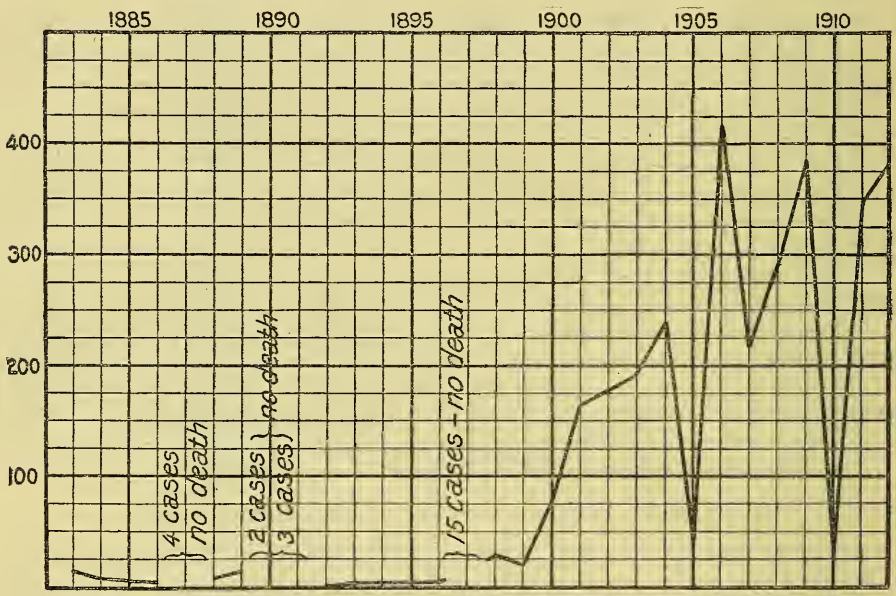

CHART 7.—Smallpox—Number of cases notified per annum for each death registered—Michigan—1883 to 1912.

to the health officer or board of health all cases of "smallpox, cholera, diphtheria, scarlet fever, or any other disease dangerous to the public health." The notice was to state the name of the patient, the name of the disease, and the name of the householder or hotel keeper giving the information; also the address where the patient was to be found. Physicians were similarly required to report cases, and when the physician reported a case the householder or hotel keeper was not required to do so.

The Michigan law seems to be the first one looking to the comprehensive collection of information in regard to the prevalence of disease, and for a number of years the work was carried on with

intelligence and perseverance under the able supervision of Dr. Henry B. Baker, secretary of the State board of health. Dr. Baker was truly a pioneer in this work and many years ahead of his time in his appreciation of its importance.

Present status.—In the United States the authority to require the notification of cases of sickness resides in the respective State legislatures. In some of the States authority has been given to the State boards of health to cover the subject by regulations. In most instances local authorities have the right to supplement the State requirements by such additional ones as may be needed. The laws

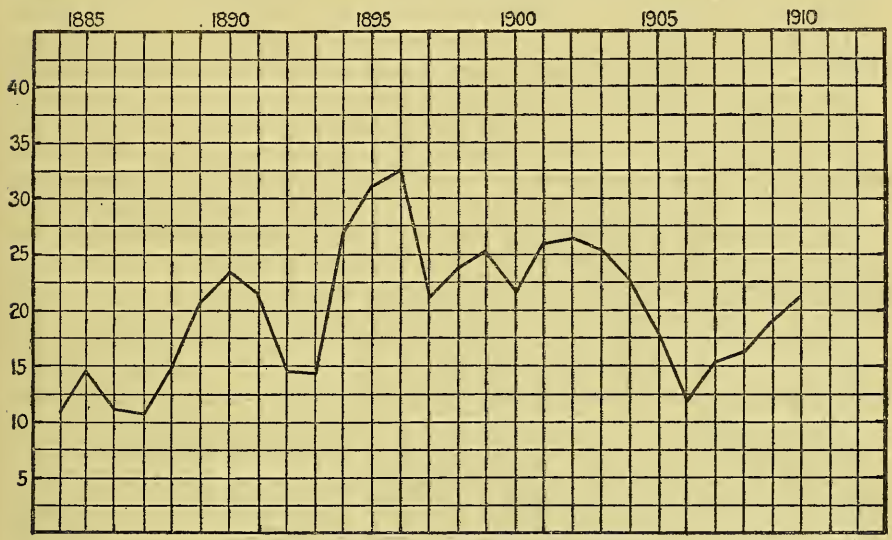

CHART 8.—Scarlet fever—Number of cases notified per annum for each death registered—Michigan—1884 to 1910.

and regulations of the several States differ widely, as do also the efforts made to enforce them.

The common and most general plan is to require that the original report be made by the physician to the local health officer immediately on diagnosis of the case. The local health officer forwards to the State health department, either immediately or at intervals, a transcript or a summary of the notifications received by him. In a number of States these reports by the local health departments are made to the State authorities daily, in some weekly, in one State twice a month, in several States monthly, and in a few States at longer intervals. In the States in which the reports are made daily the State health department is in a position to keep constantly informed regarding the prevalence of the notifiable diseases. The same is in less measure true when the reports are made weekly.

When the reports are made at longer intervals the current value of the information to the State department is largely lost.

In two States physicians are required to report the notifiable diseases directly to the State health department. This, in effect, makes the State health officer also the local health officer and responsible for the control of the notifiable diseases, the control of disease

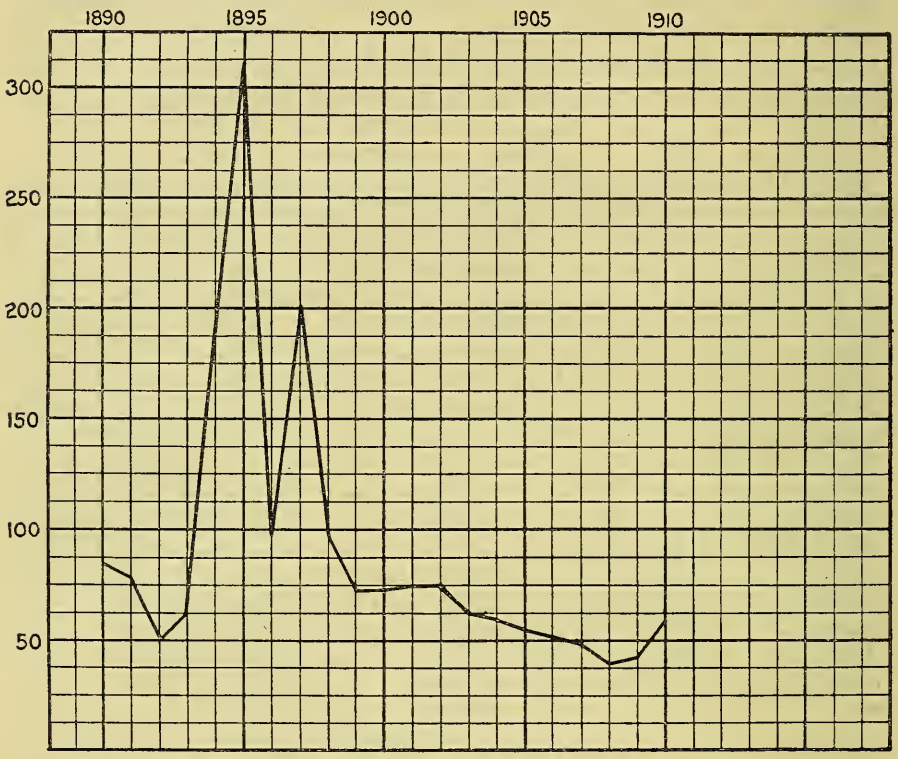

CHART 9.—Measles—Number of cases notified per annum for each death registered—Michigan—1890 to 1910.

and the notification of cases being inseparable, the latter giving the necessary information by which to direct action in the former.

In some States the laws relating to morbidity reports specify that cases of certain classes of disease shall be notifiable. These classes have been variously stated, the wording being in some instances that "all cases of contagious or infectious diseases dangerous to the public health shall be reported," in others "all communicable diseases," or "all contagious diseases," or "all diseases dangerous to the public health." When the requirements have been stated in general terms in this way their enforcement has been especially difficult unless the diseases included have been specifically enumerated.

The Notifiable Diseases.

The following-named diseases are those specified by the various State requirements, with the number of States in which each is notifiable:

Actinomycosis	6
Anthrax	15
Barber's itch	1
Beriberi	3
Cancer	3
Cerebrospinal meningitis	29
Chagres fever	1
Chicken-pox	21
Cholera (Asiatic)	41
Colibacilosis	1
Dengue	8
Diphtheria	46
Dysentery	3
Echinococcus disease	1
Epidemic dysentery	6
Amebic dysentery	2
Erysipelas	6
Favus	2
Filariasis	1
Follicular conjunctivitis	1
German measles	8
Glanders	13
Gonococcus infection	5
Hookworm disease	7
Impetigo contagiosa	1
Leprosy	28
Malaria	9
Malta fever	1
Measles	31
Mumps	7
Ophthalmia neonatorum	14
Paragonimiasis (lung-fluke disease)	2
Paratyphoid fever	3
Pellagra	8
Plague	28
Pneumonia	11
Poliomyelitis	26
Puerperal fever	4
Rabies	10
Relapsing fever	4
Rocky Mountain spotted fever	3
Scabies	1
Scarlet fever	45
Septic sore throat	1
Smallpox	49
Syphilis	6
Tetanus	8
Tetanus infantum	1
Trachoma	11
Trichinosis	6
Tuberculosis:	
All forms	29
Communicable forms	1
Laryngeal	6
Pulmonary	10
Typhoid fever	35
Typhus fever	31
Whooping cough	27
Yellow fever	35
Venereal diseases	2
Mental deficiency (including epilepsy)	1
Occupational diseases:	
Arsenic poisoning	12
Brass poisoning	5
Carbon monoxide poisoning	1
Lead poisoning	14
Mercury poisoning	12
Natural gas poisoning	1
Phosphorus poisoning	12
Wood alcohol poisoning	5
Naphtha poisoning	1
Bisulphide of carbon poisoning	1
Dinitrobenzine poisoning	1
Caisson disease (compressed-air illness)	12

The Model State Law for Morbidity Reports.

Since each State has exclusive authority within its jurisdiction over the requirements for the notification of disease, any comprehensive plan that may be developed for morbidity reports and morbidity statistics must be the result of combined effort and cooperation and the enactment by the several States of similar requirements. It implies also an adequate enforcement of these requirements. The question of State morbidity reports is one of the most difficult prob-

lems to be solved by the State authorities. A number of States have been endeavoring earnestly to solve the problem within their respective jurisdictions. Considerable progress has been made in several instances. The question is an important one, and is bound to receive much consideration during the next decade. The State health authorities in conference with the Public Health Service had the matter under consideration for some time and in June, 1913, approved a model State law for morbidity reports. (See appendix pp. 71–74.)

The model law makes the following-named diseases notifiable:

GROUP I.—INFECTIOUS DISEASES.

Actinomycosis.
Anthrax.
Chicken-pox.
Cholera, Asiatic (also cholera nostras when Asiatic cholera is present or its importation threatened).
Continued fever lasting seven days.
Dengue.
Diphtheria.
Dysentery:
(*a*) Amebic.
(*b*) Bacillary.
Favus.
German measles.
Glanders.
Hookworm disease.
Leprosy.
Malaria.
Measles.
Meningitis:
(*a*) Epidemic cerebrospinal.
(*b*) Tuberculous.
Mumps.
Ophthalmia neonatorum (conjunctivitis of newborn infants).
Paragonimiasis (endemic hemoptysis).
Paratyphoid fever.
Plague.
Pneumonia (acute).
Poliomyelitis (acute infectious).
Rabies.
Rocky Mountain spotted (or tick) fever.
Scarlet fever.
Septic sore throat.
Smallpox.
Tetanus.
Trachoma.

GROUP I.—INFECTIOUS DISEASES—Continued.

Trichinosis.
Tuberculosis (all forms, the organ or part affected in each case to be specified).
Typhoid fever.
Typhus fever.
Whooping cough.
Yellow fever.

GROUP II.—OCCUPATIONAL DISEASES AND INJURIES.

Arsenic poisoning.
Brass poisoning.
Carbon monoxide poisoning.
Lead poisoning.
Mercury poisoning.
Natural gas poisoning.
Phosphorous poisoning.
Wood alcohol poisoning.
Naphtha poisoning.
Bisulphide of carbon poisoning.
Dinitrobenzine poisoning.
Caisson disease (compressed-air illness).
Any other disease or disability contracted as a result of the nature of the person's employment.

GROUP III.—VENEREAL DISEASES.

Gonococcus infection.
Syphilis.

GROUP IV.—DISEASES OF UNKNOWN ORIGIN.

Pellagra.
Cancer.

The provisions of the model law slightly amended have already been adopted by the State of Kansas through regulations promulgated December 13, 1913. As opportunity affords other States will undoubtedly take similar action.

The Results of Notification in Certain States and Cities.

The completeness of the reports of the notifiable diseases in States and cities in which there is registration of deaths may be estimated with some degree of accuracy by comparing the number of cases reported with the number of deaths registered as due to the same cause. In doing this, however, it must be borne in mind that we do not know the fatality rates of many diseases, for up to the present time there have seldom been satisfactory morbidity records of sufficiently broad application to permit of the determination of such rates, and it must also be remembered that the fatality rates of many diseases vary in different epidemics, and from year to year, and with the seasons and geographic location.

To show the possibilities of notification and the results being obtained in certain diseases in those States and cities in which notification has been developed to a degree approaching most closely one that is satisfactory, the following tables are presented. The diseases selected are diphtheria, measles, and typhoid fever. To this list others might be added. In the diphtheria table only those States and cities are included in which 10 or more cases were reported for each death registered; in the measles table only those States and cities in which at least 50 cases were reported for each death registered; and in the typhoid fever table only those in which 7 or more cases were reported for each death registered. One of the most interesting features of these tables, and one to which the reader's attention is invited, is the relatively large number of cases reported in some cities and States for each death. The relatively small number of fatal cases suggests the existence of fatality rates much lower than those commonly believed to prevail.

The material for these tables was taken from the Public Health Reports.[1] The data was originally obtained by the Surgeon General of the Public Health Service from the health departments of the several States and cities. The deaths given in the 1912 mortality statistics of the Bureau of the Census, which are now available, differ slightly in number in most instance from those used, but the differences are not enough to affect appreciably the ratios of cases to deaths.

To explain the wide differences in fatality rates in the several cities and States one should bear in mind the possibility that the virulence of the diseases may at times vary and that the skill and facilities of practicing physicians for diagnosing certain affections may differ in the several localities.

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[1] Public Health Reports, Jan. 16, 1914, and Apr. 3, 1914.

DIPHTHERIA.

TABLE 4.—*Cases notified, case rates per 1,000 population, number of cases notified for each fatality (death) registered, and fatality rates per 100 cases, in States and cities having 10 or more cases notified for each death registered, 1912.*

States and cities.	Cases.	Fatal cases (deaths).	Case rate per 1,000 population.	Fatality rate per 100 cases.	Number of cases notified for each fatality.
STATES.					
Connecticut	1,941	191	1.758	9.84	10
District of Columbia	393	15	1.146	3.82	26
Massachusetts	5,433	473	1.555	8.70	11
Montana	139	12	.342	8.63	12
New York	18,141	1,641	1.904	9.04	11
Utah	328	24	.833	7.31	14
Virginia	2,875	92	1.363	3.20	31
CITIES.					
Boston, Mass	1,539	102	2.164	6.62	15
Cleveland, Ohio	2,605	166	4.363	6.37	16
New York, N. Y	13,533	1,125	2.672	8.31	12
St. Louis, Mo	2,548	170	3.578	6.67	15
Cincinnati, Ohio	638	60	1.646	9.40	11
Los Angeles, Cal	433	25	1.121	5.77	17
Newark, N. J	1,098	91	2.973	8.28	12
New Orleans, La	1,072	58	3.056	5.41	18
San Francisco, Cal	326	28	.752	8.58	12
Washington, D. C	393	15	1.146	3.82	26
Denver, Colo	377	12	1.637	3.18	31
Indianapolis, Ind	633	35	2.563	5.52	18
Providence, R. I	848	75	3.605	8.84	11
Rochester, N. Y	495	16	2.148	3.23	31
St. Paul, Minn	392	23	1.472	5.86	17
Seattle, Wash	224	11	.807	4.91	20
Albany, N. Y	328	29	3.224	8.84	11
Birmingham, Ala	220	14	1.464	6.36	16
Cambridge, Mass	264	26	2.450	9.84	10
Columbus, Ohio	415	39	2.141	9.39	11
Dayton, Ohio	582	43	4.835	7.38	14
Grand Rapids, Mich	100	10	.846	10.00	10
Nashville, Tenn	91	7	.806	7.69	13
Richmond, Va	206	8	1.567	3.88	26
Salt Lake City, Utah	159	3	1.571	1.88	53
Spokane, Wash	66	5	.545	7.57	13
Syracuse, N. Y	422	24	2.938	5.68	18
Worcester, Mass	411	26	2.701	6.32	16
England and Wales (1911)	47,747	4,898	1.32	10.26	9.75
London (1911)	7,404	626	1.64	8.45	11.83

MEASLES.

TABLE 5.—*Cases notified, case rates per 1,000 population, number of cases notified for each fatality (death) registered, and fatality rates per 100 cases, in States and cities having 50 or more cases notified for each death registered, 1912.*

States and cities.	Cases.	Fatal cases (deaths).	Case rate per 1,000 population.	Fatality rate per 100 cases.	Number of cases notified for each fatality.
STATES.					
Connecticut	6,537	116	5.630	1.77	56
District of Columbia	1,638	7	4.778	.42	234
Illinois	10,392	189	1.785	1.81	55
Maryland	1,675	20	2.233	1.20	84
Massachusetts	22,423	286	6.421	1.27	78
New York	65,299	1,049	6.854	1.60	62
Utah	3,117	11	7.892	.35	283

TABLE 5—*Cases notified, case rates per 1,000 population, number of cases notified for each fatality (death) registered, and fatality rates per 100 cases, in States and cities having 50 or more cases notified for each death registered, 1912*—Continued.

States and cities.	Cases.	Fatal cases (deaths).	Case rate per 1,000 population.	Fatality rate per 100 cases.	Number of cases notified for each family.
CITIES.					
Boston, Mass	5,666	111	7.967	1.95	51
Chicago, Ill	6,784	119	2.956	1.75	57
Cleveland, Ohio	2,230	34	3.735	1.52	66
New York, N. Y	39,018	671	7.704	1.72	57
St. Louis, Mo	6,549	73	9.197	1.11	90
Cincinnati, Ohio	2,715	34	7.005	1.25	80
Los Angeles, Cal	253	1	.655	.39	253
Milwaukee, Wis	2,316	25	5.785	1.07	93
New Orleans, La	324	2	.923	.61	162
San Francisco, Cal	3,451	47	7.961	1.36	73
Denver, Colo	72	1	.313	1.39	72
Indianapolis, Ind	3,556	12	14.400	.33	296
Rochester, N. Y	2,002	28	8.694	1.39	71
St. Paul, Minn	282	1	1.058	.35	282
Albany, N. Y	437	2	4.295	.45	218
Birmingham, Ala	868	9	5.777	1.03	96
Cambridge, Mass	1,015	10	9.421	.98	101
Dayton, Ohio	643	7	5.342	1.08	92
Hartford, Conn	663	12	6.425	1.81	55
Richmond, Va	851	1	6.473	.12	851
Salt Lake City, Utah	1,074	2	10.611	.18	537
Spokane, Wash	1,133	6	9.364	.53	188
Syracuse, N. Y	605	7	4.213	1.15	86
Toledo, Ohio	1,350	27	7.635	2.00	50

TYPHOID FEVER.

TABLE 6.—*Cases notified, case rates per 1,000 population, number of cases notified for each fatality (death) registered, and fatality rates per 100 cases, in States and cities having 7 or more cases notified for each death registered, 1912.*

States and cities.	Cases.	Fatal cases (deaths).	Case rate per 1,000 population.	Fatality rate per 100 cases.	Number of cases notified for each fatality.
STATES.					
Connecticut	924	128	0.795	13.85	7.2
District of Columbia	585	78	1.706	13.33	7.5
Maryland	1,795	229	2.387	12.75	7.8
Massachusetts	2,088	269	.597	12.88	7.8
Utah	549	57	1.390	10.38	9.6
Virginia	4,330	260	2.054	6.00	16.6
CITIES.					
Boston, Mass	460	57	.647	12.39	8.1
Cleveland, Ohio	271	38	.454	14.02	7.1
Philadelphia, Pa	1,514	200	.942	13.21	7.5
Newark, N. J	193	26	.523	13.48	7.4
Denver, Colo	498	30	2.163	6.02	16.6
Providence, R. I	206	24	.876	11.65	8.6
Seattle, Wash	149	20	.537	13.42	7.4
Birmingham, Ala	490	56	3.261	11.43	8.7
Bridgeport, Conn	58	8	.532	13.80	7.2
Cambridge, Mass	55	5	.511	9.09	11.0
Grand Rapids, Mich	316	40	2.674	12.66	7.9
Hartford, Conn	76	4	.737	5.26	19.0
Lowell, Mass	86	10	.791	11.63	8.6
Richmond, Va	208	22	1.582	10.58	9.5
Salt Lake City, Utah	163	17	1.611	10.43	9.6
Worcester, Mass	70	5	.460	7.14	14.0
England and Wales (1911)	13,730	2,416	.38	17.62	5.68
London (1911)	1,024	145	.23	14.16	7.06

As the result of Dr. Baker's work Michigan has records of the prevalence of a number of communicable diseases from the early eighties. These records show that during the 15 years, 1882 to 1896, inclusive, there were in Michigan 1,320 reported cases of smallpox, with 314 deaths, and a fatality rate for the period of 23.8 per cent. During the succeeding 14 years, 1897 to 1910, inclusive, the State of Michigan had 38,243 reported cases, with 361 deaths, and a fatality rate for the period of 0.94 per cent. During the 10 years, 1884 to 1893, inclusive, Michigan had an annual average of 3,909 reported cases of diphtheria, with an average of 913 deaths, and a fatality rate of 23.4 per cent. During the 17 years, 1894 to 1910, inclusive, the average annual

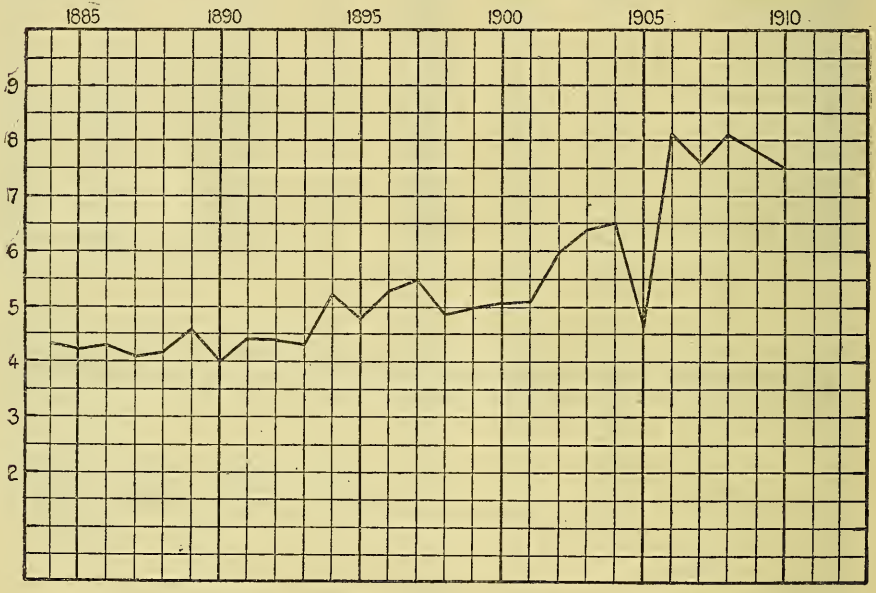

CHART 10.—Diphtheria—Number of cases notified per annum for each death registered—Michigan—1884 to 1910.

number of reported cases was 3,133, the average number of deaths 529, giving a fatality rate of 16.9 per cent. During the 27 years, 1884 to 1910, Michigan had an average of 4,288 reported cases of scarlet fever, with an average of 277 deaths, and a fatality rate of 5.3 per cent. The Michigan records for measles go back only as far as 1890, and during the 21 years, 1890 to 1910, inclusive, the average number of cases reported annually was 10,995, with an average number of deaths of 148, giving a fatality rate based upon reported cases and deaths of 1.3 per cent.

Source of Statistical Data.

The manner of collecting the data from which morbidity statistics are compiled is closely allied to the registration method used for births. The data consist of the reports of cases of disease made usually

by physicians and in some instances by the heads of families and households. The original observers then, upon whom morbidity statistics depend chiefly for their completeness, are the practicing physicians. This is necessarily so, for neither the health department nor any other branch of government can keep in such close touch with the lives of the people as to be in a position to know of the occurrence of disease. The physician is the one, who because of the very nature of his work and his relation to the community, is best able to have this information and furnish it. He comes in contact with the sick to a degree others do not. The health officer can not know of the

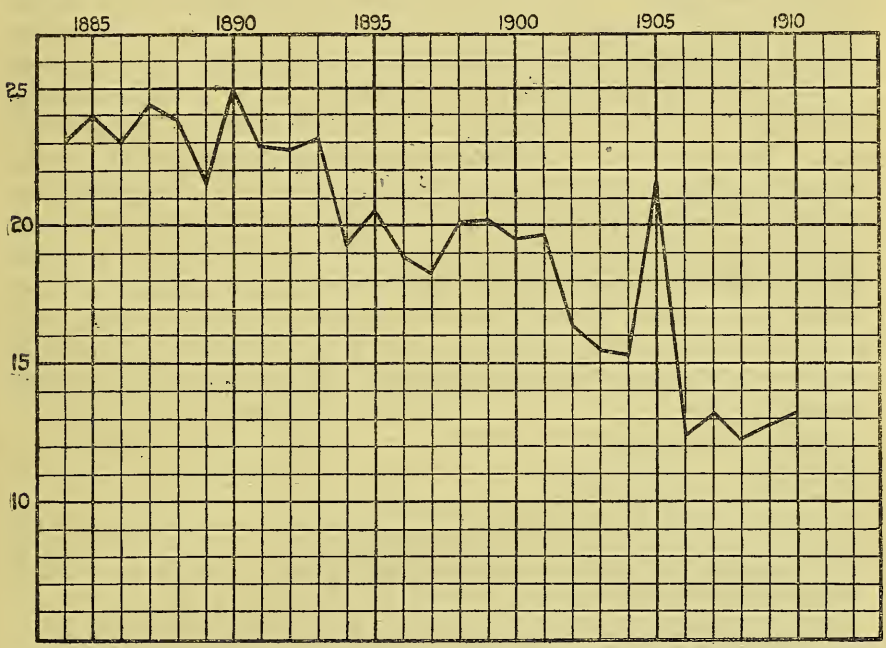

CHART 11.—Diphtheria—Fatality rate (number of deaths registered per annum per 100 notified cases)—Michigan—1884 to 1910.

presence of disease except as it is reported to him by physicians. Experience has shown that there may be hundreds of cases of a dangerous infection in a city and the health officer not know of its presence in the absence of notification.

Unfortunately many practicing physicians have little knowledge of the methods of health administration and in common with people in general frequently expect the health department in some mysterious manner to control disease without placing upon them the burden and privilege of cooperating by the notification of the occurrence of cases. The practicing physician, whether he recognizes it or not, or is so recognized by the community, is essentially an adjunct of the health department, for unless he performs his part the health department is in large measure helpless.

Among practicing physicians, at least in the United States, there has at times been the feeling that the knowledge of a disease in a patient is privileged information which they should not be called upon to impart. In communities where the laws require the notification of the disease this feeling has no legal basis and the physician who does not make report is not a law-abiding citizen. But aside from the legal aspects of the matter there would seem to be little justification for such a course. Every physician has a number of individuals or families who look to him, and properly so, not only for treatment, but also for such reasonable protection from disease as he is able to give. The failure to report the occurrence of a case of communicable disease in one patient may lead to its spread to others among his clientele whose rights he has ignored. He therefore violates the intent and spirit of the ethical principle of the protection of patients among whom must be considered the well together with the sick. The notification of disease is in the interests and for the protection of the community, and as his patients are usually members of the community their interests are ignored and because of the antisocial whim or supposed convenience of the individual affected with a notifiable disease they are deprived of the protection they have a right to expect. It would seem that the physician who fails to report his cases of preventable diseases required to be notified may properly be considered as actively obstructing public health administration.

Related in thought is the following quotation from an address by Prof. Victor C. Vaughan.[1]

> However, no medical man treats any infectious disease without, at the same time, rendering a service to the public. He takes care of his case of diphtheria, or scarlet fever, or measles, and at the same time he renders a larger service to the public in preventing the spread of infection. * * *
>
> In the future the training of the medical man must be developed largely with a view to his broader relations to the public. His proper function must be to prevent, rather than cure disease. The physician's duties are to become more and more largely official in the sense that his services are to be rendered to the community, and not exclusively to the individual.

The health department laboratory may be, and in many places is, an important factor in giving information of the occurrence of cases and prevalence of certain diseases. By having a diagnostic laboratory with a trained personnel at the service of the practicing physician the health department becomes not only a consultant performing gratuitous service for the physician but at the same time secures early and accurate information of many cases which otherwise might not be properly diagnosed and therefore not reported. A record of every positive diagnosis made by the laboratory should be sent to the epidemiological bureau or other division of the health

[1] Pennsylvania Medical Journal, November, 1913.

department responsible for the control of disease and should for purposes of morbidity records constitute notification of the case when accompanied by such necessary information as the name, age, sex, and address of the patient. There would seem to be no good reason why the services of the health department should not be at the disposal of the community for the diagnosis of all diseases.

Nature of Information Secured by Morbidity Notification.

It is the practice for health departments to furnish to physicians notification blanks upon which the reports are to be made. In some instances these are in the form of post cards, which have proper spaces indicated for notation of the required information. These cards require the physician to affix a stamp before mailing them to the health department. A far better practice is that employed by many States and cities of supplying physicians with postal-card forms which do not require additional postage before mailing.

The information relating to the reported cases which physicians are required to give varies in the several States. It has usually been customary to require the physician, in making his report, to include all the data regarding the case desired by the health department. In the majority of instances no further data regarding these cases are secured by the health officials. While it may be impracticable in most instances to change this practice at the present time, it must be recognized that a local health department should prefer to collect its data regarding each case itself, and should not be willing to depend upon the physician's report for its epidemiologic information. Logically, the only information which the physician should be depended upon to give in his report is the occurrence of a case, or a suspected case, of a given disease in such and such a person at such and such an address. He might properly be required to add to this such data as are matters of record or easily verified, such as the age, color, and sex of the patient, and similar information. The local health department, however, should be reluctant to depend upon the diagnosis of the practicing physician, unless the diagnosis has been verified by a trained diagnostician in the service of the department itself. This has been the practice during recent outbreaks of such diseases as yellow fever and plague. It is also the practice in certain other instances. It must necessarily become the practice whenever a determined effort is to be made in the control of any preventable disease.

The Standard Notification Blank.

The standard notification blank (see appendix, p. 74) approved by the State and Territorial health authorities of the United States in conference with the Public Health Service at their tenth annual conference in June, 1913, calls for the following information:

1. Date.
2. Name of disease or suspected disease.

3. Patient's name, age, sex, color, and address. (This is largely for purposes of identification and location.)
4. Patient's occupation. (This serves to show both the possible origin of the disease and the probability that others have been or may be exposed.)
5. School attended by or place of employment of patient. (Serves same purpose as the preceding.)
6. Number of persons in the household, number of adults and number of children. (To indicate the nature of the household and the probable danger of the spread of the disease.)
7. The physician's opinion of the probable source of infection or origin of the disease. (This gives important information and frequently reveals unreported cases. It is of particular value in occupational diseases.)
8. If the disease is smallpox, the type (whether the mild or virulent strain) and the number of times the patient has been successfully vaccinated, and the approximate dates. (This gives the vaccination status and history.)
9. If the disease is typhoid fever, scarlet fever, diphtheria, or septic sore throat, whether the patient had been or whether any member of the household is engaged in the production or handling of milk. (These diseases being frequently spread through milk, this information is important to indicate measures to prevent further spread.)
10. Address and signature of the physician making the report.

These reports are to be made on postal cards furnished for the purpose and mailed immediately to the local health department, so that proper measures can be taken to prevent the spread of the disease or to find the focus or source from which the case originated, that the occurrence of additional cases may be prevented. These reports are then to be forwarded to the State department of health, but before being forwarded the local health department is to note thereon:

1. Whether the case was investigated by the local health department.
2. Whether the nature of the disease was verified.
3. What measures were taken by the local health department to prevent the spread of the disease or the occurrence of additional cases from the same origin.

The standard notification blank has been adopted in two States.

Sources of Error in Morbidity Statistics.

The errors in morbidity statistics are due principally to incomplete notification—that is, to the failure of physicians to report all cases of the notifiable diseases. More cases of disease usually occur than are reported. This can never be entirely overcome, for many diseases vary in severity under different conditions, and some cases are so mild that their true nature is not recognized, and frequently they do not come to the attention of physicians.

The cases notified are usually correctly diagnosed, for physicians do not generally report cases until they are practically sure of the diagnosis, as the case remains an evidence of faulty diagnosis if a mistake is made. Then, too, physicians naturally wish to report only

those cases required and to know whether a given case is one of these he must first be reasonably sure of his diagnosis.

The errors in morbidity statistics are therefore chiefly those of incompleteness. In this they resemble birth statistics, although the degree of incompleteness, due to the difference in the nature of the two, is usually greater in morbidity statistics.

They differ from mortality statistics, in which the principal source of error is incorrect statements of cause of death. Due to the control possible over the disposal of bodies of the dead, it is not difficult in most communities to obtain practically complete registration of deaths. It is, however, exceedingly difficult to secure correct statements of the causes of death. The physician feels compelled to give a diagnosis in each death certificate and usually does so even when he is uncertain of the nature of the malady, realizing probably that the body will be buried and that there will be nothing to show the error if one is made.

The tendency is then in morbidity reports for the diagnoses to be correctly given, but not all cases reported, while in the registration of deaths the tendency is for the recording of practically all deaths but the filing of many incorrect statements of the causes of death.

Uses of Morbidity Reports and Statistics.

In health administration, morbidity reports—that is, reports of cases of sickness—serve several purposes, which may be briefly stated to be as follows:

1. In the communicable diseases morbidity reports show the occurrence of cases which constitute foci from which the disease may spread to others, as in scarlet fever, typhoid fever, tuberculosis, or yellow fever, and make it possible to take proper precautions to protect the family of the patient, his associates, or the community at large.

2. In some diseases morbidity reports make it possible to see that the sick receive proper treatment, as in ophthalmia neonatorum, diphtheria, and, in certain cities, tuberculosis. The reporting of cases of ophthalmia in the newborn makes it possible to save the sight of some infants who would otherwise not receive adequate treatment until after much damage had been done. In diphtheria the health department can be of service in furnishing antitoxin. Some cities furnish hospital or other relief to consumptives who would otherwise be without proper treatment.

3. In diseases that are not communicable, such as those due to occupation or environment, reported cases show the location of conditions which are causing illness or injury. This makes it possible to remedy the faulty conditions, so that others may not be similarly injured.

4. In certain diseases, of which the cause or means of spread is unknown, morbidity reports show their geographic distribution and varying prevalence and the conditions under which cases occur. This information has great potential value in attempts to ascertain their causes and means of spread.

5. Reports of the occurrence of disease are necessary to show the need of certain sanitary measures or works and to control and check the efficiency of such measures or works when put into operation. In pulmonary tuberculosis such reports show the number of consumptives in the community and the need of sanatoria. In malaria they show the prevalence of the disease, the need for drainage and other antimosquito work, the efficiency of such work when in operation, and when a change in the prophylactic measures or additional ones are necessary. In typhoid fever they show faults in the water supply or in the control of the production and distribution of milk or in the disposal of excreta in special localities.

6. Morbidity reports when recorded over a period of time and properly compiled become a record of the past occurrence of disease. They show the relative prevalence of disease from year to year and under varying conditions. They show the effect of the introduction of public-health measures and of sanitary works. They give a history of disease not obtainable in their absence.

Morbidity Rates.

Crude morbidity rates.—Morbidity rates may be expressed as the number of cases of a given disease occurring during a year per 1,000 of the total population, or the rate may be expressed as the number of cases per 10,000 or per 100,000 population. Giving the rate per 1,000 population has the advantage of employing the same population unit as that used for expressing birth, marriage, and death rates. It has, however, what has been considered by some a disadvantage, namely that the rates will more frequently be fractions where the 1,000 unit of population is taken as the basis. For this reason 10,000 and 100,000 population units have often been used. The medical officer of the local government board of England and Wales uses the 1,000 unit in stating morbidity rates.

Specific morbidity rates.—Diseases limited entirely or principally to certain ages or to certain classes of the population should be expressed also in rates of the number of cases per 1,000 persons in the population of that age or class. Diseases limited to childhood should be expressed as rates per 1,000 children; diseases limited to women should be expressed as rates per 1,000 women. Occupational disease rates should be expressed in terms of the number of cases per 1,000 persons employed.

Specific morbidity rates showing the incidence of disease by age groups, sex, occupation, and economic or social condition will be possible with the improved notification methods which are being gradually adopted.

Fatality rates.—The fatality or case mortality rate of a disease is usually expressed in terms of the number of deaths per 100 cases; that is, as the percentage of cases which terminate fatally. In calculating fatality rates it is to be borne in mind that among cases reported during one week, month, or year, all or part of the fatal terminations may occur during a succeeding week, month, or year.

Hospital statistics and sickness insurance records.—In a number of foreign countries much valuable information regarding sickness rates, aside from that of the commonly notifiable diseases, is being secured from the workingmen's sickness insurance records. In some countries hospital statistics are compiled and furnish data of much value. Bolduan [1] has suggested a plan for compiling hospital morbidity statistics in this country. The method is especially applicable to the hospitals of a large city, but might be used for the hospitals of an entire State and is capable of being made nation wide in scope. The essential feature of the plan is the filling out of "discharge certificates," analogous to ordinary death certificates, on the discharge of each patient from a hospital. These discharge certificates are then sent to a central filing bureau, preferably the health department, and there classified and analyzed. For a copy of the proposed "discharge certificate" see appendix, page 75.

The fund of valuable information which might be acquired by the use of the statistical method in the study of hospital experience and the proper treatment of hospital statistics has been most ably discussed by Frederick L. Hoffman in his work on "The Statistical Experience Data of the Johns Hopkins Hospital, Baltimore, Md., 1892–1911." [2]

It is also especially desirable to have statistics of the insane and mentally defective. New Jersey has recently enacted a law requiring the notification of cases of mental deficiency and of epilepsy.

Factors Influencing Morbidity Rates.

The factors which influence morbidity rates and the prevalence of sickness are the manifold direct and indirect causes of disease. There are certain widely acting indirect factors which increase morbidity by lessening individual resistance. There are other factors which are specific for individual diseases. In malaria the direct cause is infectious anopheline mosquitoes, and the indirect cause swamps

[1] Bolduan, Charles F.; Hospital morbidity statistics; New York Medical Journal; Mar., 1913; p. 643.
[2] The Johns Hopkins Hospital Reports. Monographs, New Series No. IV.

and stagnant water in which the mosquitoes breed. The factors influencing typhoid fever rates are commonly the milk supply, the water supply, the manner of disposal of excreta, presence of flies, the extent to which houses are screened, personal and social habits, etc. In an industrial community the morbidity from occupational diseases and from diseases caused indirectly by the conditions attending certain kinds of labor constitutes a factor the importance of which is beginning to be realized. A discussion of the factors influencing morbidity rates would require a treatise on epidemiology and hygiene.

Notification of Occupational Diseases.

Most civilized nations have during the last hundred years undergone an industrial revolution. It has been within this period that the large factory with its hundreds or thousands of workers has had its development and that many of our present industries and the majority of our industrial processes have been developed. So great has been this change in the industrial life of the people that there has been developed a new and important branch of hygiene and sanitation which is properly termed industrial hygiene. With this industrial development there have evolved new diseases and disabilities due to the nature of the individual's work or to the conditions incident to the work. Not only have new diseases in a sense been evolved, but a number of diseases previously rare have become much more common. Under existing social conditions a large proportion of the people are engaged in some occupation, and the diseases of occupation merit the attention and consideration of the community.

Due largely to the activities of the American Association for Labor Legislation the question of the control of occupational diseases has during the last few years been receiving much consideration. Naturally the first step in the control of the industrial diseases was the securing of a means by which the occurrence and prevalence of these diseases might be known to those whose duty it would be to control them. For this purpose, and largely because of the activities of the American Association for Labor Legislation and its secretary, John B. Andrews, a number of States have since 1911 enacted laws requiring the notification of certain occupational diseases. Fourteen States have enacted laws on the subject. One State has enacted a law appointing a commission to draft regulations covering the notification and control of occupational diseases, and one State by regulation of the State board of health requires the notification of these diseases. Abstracts of the State requirements will be found in the appendix, pages 76–82.

A number of State laws require cases of occupational diseases to be notified to the State health department, and others require the

notifications to be made to the State labor office. The results of notification have not been as yet satisfactory. This may be due to the newness of the idea to the physician of considering whether a disease is occupational in origin. The medical schools have given little attention to the subject. It is highly important to the practicing physician that he have a knowledge of the industries of his community and of the diseases and disabilities they are likely to cause. The proper and successful treatment of patients necessarily depends upon a knowledge of the direct or indirect cause of the individual's ailment, and in an industrial community this will depend frequently upon a knowledge of occupational diseases.

A number of States have enacted laws which should in a way be much more successful in bringing to light the occurrence of these diseases (Illinois, Missouri, Ohio, and Pennsylvania. See appendix, pages 76, 78, and 79). The plan referred to is that of requiring certain industries to have their employees examined physically by a competent physician at stated intervals to ascertain whether there exist in the employees any ailments or disabilities due to the nature of their occupation. The physicians making these examinations naturally become in time expert, if they are not so in the beginning, and the examination of the employees in this way will guarantee the finding of a large proportion of the cases of industrial diseases, and that in most instances in their earliest stages. If the occupational diseases are to be controlled, it is necessary that the occurrence of cases be ascertained in some way, for the occurrence of each case shows the existence of conditions which have produced disease in one employee and will in all probability produce it in others. Each case notified shows a danger spot.

MORTALITY STATISTICS.

Mortality statistics are statistics of deaths. They are of interest primarily because of their relation to changes in population. Aside from the factor of emigration, mortality statistics show the losses in numbers being sustained by the population, just as birth records show the additions. Where migration is a factor having an appreciable effect upon population it likewise merits statistical consideration, for it, too, represents population gains and losses.

Mortality statistics have performed another important service in creating an interest in public health administration and securing support for sanitary measures. They show the extent of the loss by death caused by diseases. In the absence of morbidity records they have also frequently been used as an index of the prevalence of certain infections. It has been possible to use mortality statistics for the latter purpose on the assumption that the fatality rates of disease

are fairly constant. However, we should bear in mind what Newsholme has said:

> The registration of deaths gives a very imperfect view of the prevalence of disease. * * * It is fallacious to assume any fixed ratio between sickness and mortality. The fatality of a given infectious disease varies greatly in different outbreaks under varying conditions. The highest ratio of sickness is occasionally found associated with a favorable rate of mortality.

This absence of fixed fatality rates is shown by the experience in the United States with smallpox, in which the ratio of deaths to cases has varied from 1:1,000 to 1:3; measles, in which the ratio of deaths to cases has been from 1:800 to 1:5; typhus fever (Brill's disease), in which it has varied from 1 : 5 to practically no fatality; and typhoid fever, in which the ratio has varied from 1:24 to 1:5.

Registration of Deaths in England and the United States.

The history of the registration of deaths in England and the United States is coupled with that of marriages and births, and was referred to previously in connection with the registration of births. The accurate registration of deaths in England dates from 1837. In the United States dependable registration was first enforced in Massachusetts and New Jersey. Other States have had laws of various types, mostly inadequate. Only recently have any number of States secured anything like complete registration. The bringing about of accurate death registration in the United States is due largely to the efforts made by the Bureau of the Census, and especially to the untiring efforts of Dr. Cressy L. Wilbur, chief statistician.

United States Registration Area for Deaths.

The registration area for deaths established by the United States Bureau of the Census includes the States and cities in other States which effectively enforce satisfactory registration laws and in the opinion of the Director of the Census have at least 90 per cent of all deaths registered. This area was first established in 1880 and at that time included Massachusetts, New Jersey, and certain cities in other States. The States included for 1912 were:[1]

California.	Minnesota.	Ohio.
Colorado.	Missouri.	Pennsylvania.
Connecticut.	Montana.	Rhode Island.
Indiana.	New Hampshire.	Utah.
Kentucky.	New Jersey.	Vermont.
Maine.	New York.	Washington.
Maryland.	North Carolina (municipalities of 1,000 population or over in 1900).	Wisconsin.
Massachusetts.		
Michigan.		

[1] Virginia was added for 1913.

The registration cities in nonregistration States were:

Alabama:
- Birmingham.
- Mobile.
- Montgomery.

Delaware:
- Wilmington.

Florida:
- Jacksonville.
- Key West.

Georgia:
- Atlanta.
- Savannah.

Illinois:
- Aurora.
- Belleville.
- Chicago.
- Decatur.
- Evanston.
- Jacksonville.
- Quincy.
- Springfield.

Kansas:
- Atchison.
- Coffeyville.
- Fort Scott.
- Hutchinson.
- Independence.
- Kansas City.
- Lawrence.
- Leavenworth.
- Parsons.
- Pittsburg.
- Topeka.
- Wichita.

Louisiana:
- New Orleans.

Nebraska:
- Lincoln.
- Omaha.

Oregon:
- Portland.

South Carolina:
- Charleston.

Tennessee:
- Knoxville.
- Memphis.
- Nashville.

Texas:
- El Paso.
- Galveston.
- San Antonio.

Virginia:
- Alexandria.
- Danville.
- Lynchburg.
- Norfolk.
- Petersburg.
- Richmond.
- Roanoke.

West Virginia:
- Wheeling.

Source of Data.

The original information from which mortality statistics are derived is obtained by the registration of deaths. This is commonly accomplished by the use of a blank or schedule prepared for the purpose and in this country known as a death certificate. The model law for the registration of births and deaths provides that no body shall be interred or otherwise disposed of or removed or temporarily held pending further disposition "more than 72 hours after death unless a permit for burial, removal, or other disposition thereof shall have been properly issued by the local registrar of the registration district in which the death occurred or the body was found. And no such burial or removal permit shall be issued by any registrar until, wherever practicable, a complete and satisfactory certificate of death has been filed with him * * *." This insures the making of a death certificate and its registration in each instance of death unless the body is surreptitiously and illegally disposed of. It therefore guarantees practically complete registration. In the rural districts of some localities bodies are frequently interred in private burial grounds and on farms in some chosen spot on the premises. Under these conditions bodies would occasionally be buried without registration, due to ignorance of the law. To meet the needs in such case the model law suggests a clause requiring every person or firm selling a casket (at retail) to keep a record showing the name and address of the purchaser, the name of the deceased, and date and place of death, and on the first of each month to report to the State registrar the sales for the pre-

ceding month; also to inclose in each casket sold a notice calling attention to the requirements of the law and a blank certificate of death. These provisions do not apply when the person selling the casket is the undertaker in charge of the burial.

The Standard Death Certificate.

The standard death certificate in use throughout the registration area for deaths calls for the following information:

Place of death.

Name, sex, color, race, conjugal condition, age, date of birth, occupation, and birthplace of decedent, name and birthplace of father, maiden name and birth place of mother.

Signature and address of informant giving preceding information.

Date and time of death and a statement as to the duration of medical attendance on the decedent, the cause of death, and its duration, are to be given by the attending physician, if any, last in attendance.

When the decedent was a recent resident or died in a hospital or other institution, the length of residence at place of death is to be given and also the former or usual residence and the place where the disease or injury was contracted.

The date and intended place of burial and the address of the undertaker are to be given over the undertaker's signature.

The date when the certificate is filed is inserted by the registrar with his signature.

The responsibility of seeing that a certificate is properly made out and filed with the registrar rests primarily upon the undertaker, according to the provisions of the model law, which specifies as follows:

SEC. 9. That the undertaker, or person acting as undertaker, shall file the certificate of death with the local registrar of the district in which the death occurred and obtain a burial or removal permit prior to any disposition of the body. He shall obtain the required personal and statistical particulars from the person best qualified to supply them, over the signature and address of his informant. He shall then present the certificate to the attending physician, if any, or to the health officer or coroner, as directed by the local registrar, for the medical certificate of the cause of death and other particulars necessary to complete the record, as specified in sections 7 and 8. And he shall then state the facts required relative to the date and place of burial or removal, over his signature and with his address, and present the completed certificate to the local registrar in order to obtain a permit for burial, removal, or other disposition of the body. The undertaker shall deliver the burial permit to the person in charge of the place of burial, before interring or otherwise disposing of the body; or shall attach the removal permit to the box containing the corpse, when shipped by any transportation company; said permit to accompany the corpse to its destination, where, if within the State of ———, it shall be delivered to the person in charge of the place of burial.

Sources of Error.

In the use of mortality statistics as well as other statistics erroneous and unwarranted conclusions are sometimes arrived at by attempting to compare incomparable data. Mortality rates secured by lax enforcement or faulty methods of registration can not properly be

compared with those based upon complete registration. Nor can the rates of communities with populations of different sex and age composition be compared unless proper allowances are made and the rates expressed in terms of the same population. For example, it is improper to compare the mortality rate of an aggregation of young men picked for physical soundness, such as an army or navy, with the crude or general mortality rate of a civilian population. The nearest means of making comparison would be to compare the rate of the picked body of men with the rate among men of the same age groups in the civil population. But even this would be faulty, for the one group would consist of men specially picked for physical fitness while the other group would include the fit and the unfit, the strong and the weak. Nor is it possible to compare the mortality rate of any special population group with the rate of the population from which it has been derived by intentional or other process of selection unless the differences in population composition are considered. Thus it would give little information of value regarding the effect of locality and environment upon the duration of life to compare the mortality rate of New York City or the registration area of the United States with that of the Canal Zone without taking into account any differences which may have been produced in the age and sex composition of the two populations by the selective process naturally operating in the case of the Canal Zone. For the same reason there is little to be gained by comparing the mortality rate of any American city or State with that of the civil employees of the Philippine Islands or any other similar group unless based upon an analysis of age and sex composition of the populations.

Another possible source of error in mortality statistics which requires to be considered is the original data contained in the death certificates from which the statistics are compiled. The personal and statistical particulars usually furnished by some member of the family are undoubtedly in most instances accurate with the exception of the statement of occupation of the decedent, which offers unusual difficulties, due to the indefiniteness of many of the terms commonly used in so far as showing the exact kind of work is concerned. This is due in some measure to the fact that the nomenclature in common use has not progressed apace with the rather rapid development of new industries and industrial processes and methods. Whereas 50 years ago the statement of occupation would have been in most cases comparatively simple and easily understood, to-day with changed industrial conditions the matter requires greater precision if useful statistical information is to result.

Perhaps the most common error entering into death registration, and therefore into mortality statistics, is in connection with the

statement of cause of death. Aside from the fact that in the instances in which it has been impossible for the attending physician to feel reasonably certain as to the nature of the terminal illness a cause of death is nevertheless usually stated in the certificate, and also the fact that at times the physician knowing the nature of the illness may, in the belief that he is shielding the family from odium or because of their whim, intentionally state an erroneous cause of death, there still remain the many unavoidable errors of mistaken diagnosis. Just how great a factor this last may be it is difficult to estimate.

However, the findings of Dr. Richard C. Cabot[1] give at least a hint of its possible importance and the extent to which it may affect that part of mortality statistics relating to causes of death. In a study of 3,000 autopsies with regard to the relation of the actual cause of death as found post mortem to the clinical diagnosis Cabot found that the percentage of correct diagnoses in various diseases was as follows:

	Percentage of correct diagnosis.
Diabetes melitus	95
Typhoid	92
Aortic regurgitation	84
Cancer of colon	74
Lobar pneumonia	74
Chronic glomerulonephritis	74
Cerebral tumor	72.8
Tuberculous meningitis	72
Gastric cancer	72
Mitral stenosis	69
Brain hemorrhage	67
Septic meningitis	64
Aortic stenosis	61
Phthisis, active	59
Miliary tuberculosis	52
Chronic interstitial nephritis	50
Thoracic aneurism	50
Hepatic cirrhosis	39
Acute endocarditis	39
Peptic ulcer	36
Suppurative nephritis	35
Renal tuberculosis	33.3
Broncho-pneumonia	33
Vertebral tuberculosis	23
Chronic myocarditis	22
Hepatic abscess	20
Acute pericarditis	20
Acute nephritis	16

[1] Cabot, Richard C. Diagnostic pitfalls identified during a study of 3,000 autopsies.—Journal American Medical Association, Dec. 28, 1912, p. 2295.

The cases studied were hospital cases under conditions assumed to be favorable to correct diagnosis. It is quite safe to assume that in medical practice at large the percentages of correct diagnosis would be found lower than those found by Cabot.

McLaughlin and Andrews [1] carried on an investigation in Manila into the nature of the diseases from which children were dying. They made post-mortem examinations of children in which certain diseases had been given as the cause of death. The diseases selected were those appearing most frequently in death certificates. The reason for the investigation was to ascertain whether the death certificates showed the real causes of death in children in Manila and if not what the actual causes of death were.

Of 37 supposed cases of acute meningitis in children under 9 years of age the actual causes of death as found post-mortem were:

Acute meningitis	2
Pneumonia	2
Empyema	1
Beriberi	10
Cholera	18
Undetermined (not meningitis)	3
Enterocolitis	1
Total	37

Of 22 supposed cases of enteritis, dysentery, and gastroenteritis in children under 7 years of age the actual causes of death found post-mortem were:

Cholera	15
Beriberi	2
Pneumonia	2
Enterocolitis	3
Total	22

Of 40 cases in which the cause of death was given as "infantile convulsions" (all but 2 were infants under 1 year of age), the actual causes of death as found post-mortem were:

Beriberi	31
Cholera	4
Pneumonia	1
Enterocolitis	1
Empyema	1
Cerebral hemorrhage	1
Undetermined	1
Total	40

[1] McLaughlin, Allan J., and Andrews, Vernon L. Studies on Infant Mortality, Philippine Journal of Science, Vol. V, No. 2, July, 1910, p. 149.

In 27 cases in which the causes of death given in the death certificate were acute or chronic bronchitis or bronchopneumonia the actual causes were found to be:

Beriberi	14
Pneumonia	6
Meningitis	2
Nephritis	2
Chronic colitis	1
Acute tonsillitis, pharyngitis, and bronchitis	1
Undetermined	1
Total	27

In 50 cases (all in infants under 1 year of age except 1) certified as dying from "infantile beriberi" the actual causes of death were found to be:

Beriberi	40
Cholera	3
Bronchopneumonia	3
Enterocolitis	1
Undetermined	3
Total	50

A summary of the series was as follows:

Assigned causes of death.		*Causes of death ascertained by autopsy.*	
Meningitis	37	Cholera	40
Enteritis	22	Beriberi	97
Convulsions	40	Pneumonia	14
Beriberi	50	Enterocolitis	7
Bronchitis	27	Meningitis	4
Total	176	Nephritis	2
		Empyema	2
		Acute tonsillitis, pharyngitis, and bronchitis	1
		Cerebral hemorrhage	1
		Undetermined	8
		Total	176

In the registration area of the United States very probably the causes given in death certificates of children correspond more nearly to the actual causes of death than they did in Manila. This, however, should be ascertained by careful studies. Mortality statistics can not be more accurate than the death certificates from which they are compiled.

For a further discussion of the possible scope of the inaccuracies entering into mortality statistics because of the faulty or incorrect statement of cause of death on death certificates the reader is referred to the Twelfth Annual Report of the Bureau of the Census giving mortality statistics for the year 1911, pages 36 to 38.

Uses of Death Registration.

Death registration serves a number of highly important purposes. Its functions are legal, economic, and social. Death registration is useful in preventing and detecting crime through the restrictions placed upon the disposal of dead bodies. It serves as evidence in the inheritance of property and in the settlement of life insurance contracts and policies. It is only proper that the time, place, and cause of death of each individual should be made a permanent record for both sentimental and legal reasons.

Death registration makes it possible to show by mathematical computations and statistical methods the extent and rate of change in population produced by deaths; the average duration of life; and, to the extent that the certified causes of death have been correctly stated, the relative frequency with which the several causes produce death. Death statistics by comparison with birth statistics give useful information regarding population increase or decrease.

Death Rates.

Death rates may be expressed as the ratio of the total number of deaths, taken as a unit, to the population. For example: 1 in 60. The usual method, however, is to express these rates in terms of the number of deaths per 1,000 population, or in some instances per 10,000 or even 100,000, or 1,000,000.

Crude death rates.—The rate which shows the proportion of all deaths to the total population, and which is usually obtained by dividing the total number of deaths by the total population in thousands, is known as the crude death rate; also as the general or central death rate. To compute the crude death rate the total number of deaths during a year and the mean population for the year (estimated population as of the middle of the year, for the calendar year as of July 1) are taken. To illustrate: In a city having a total of 900 deaths during a calendar year, and an estimated population of 60,000 as of July 1 of the year, the crude death rate would be $900 \div \frac{60,000}{1,000} = 15$ and would be expressed as 15 per 1,000 population.

Crude death rates are of value chiefly to show the numerical loss of the population by death. They also serve as a satisfactory basis for the comparison of the death rates of different communities having populations of similar composition as to age and sex. For populations of dissimilar composition they are not suitable as a basis of comparison, for the death rates of women are usually lower than those of men and the death rates of the several age groups vary within wide limits, and the death rate, therefore, depends to a marked degree upon the relative numbers of males and females and the proportion of the population included in the various age groups.

Death rates for short periods.—Death rates for short periods (for a week, month, or quarter) are expressed in terms of annual rates; that is, what the annual rate would be provided deaths occurred throughout the year with the same frequency as during the week or month under consideration. Death rates for short periods are likely to have little significance, as quite accidental causes may affect them to a considerable degree. Taken for a number of years, however, they give useful information regarding seasonal variations. If in a city there

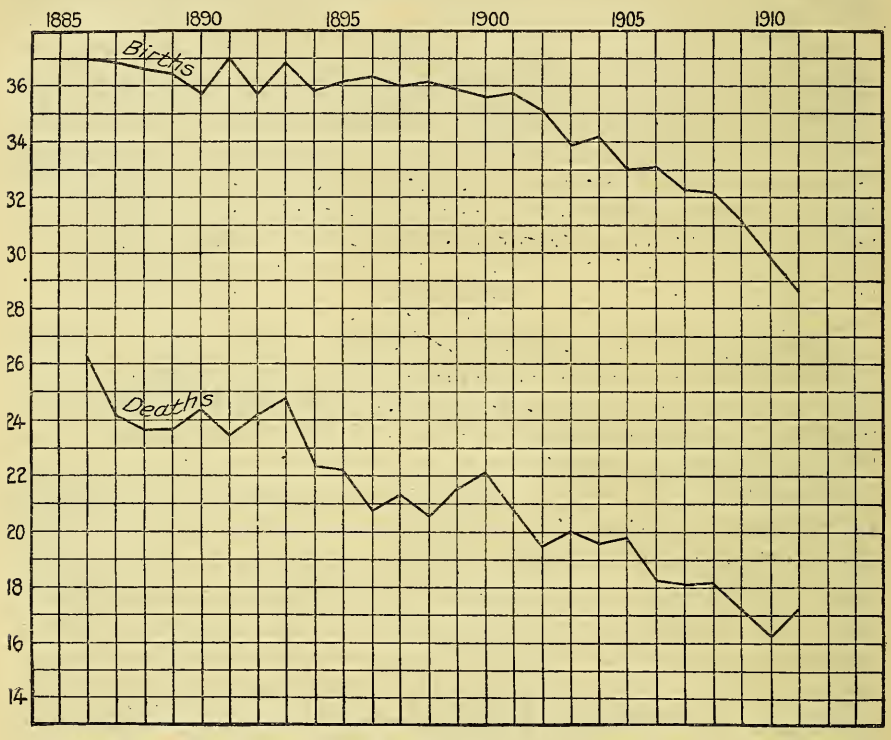

CHART 12.—Births and deaths (exclusive of stillbirths) per 1,000 population per annum—German Empire—1886 to 1911.

were 20 deaths during a given week and the mean population of the city for the year was 60,000, then the crude death rate for the week would be

$$20 \times \frac{365}{7} \left(\frac{\text{days in year}}{\text{days in week}}\right) \div \left(\frac{60{,}000}{1{,}000}\right) (\text{population of city in thousands}) = 17.38.$$

The mortality for the week would, therefore, be at the rate of 17.38 per 1,000 population per annum.

Specific death rates.—Special or specific death rates are the rates of specified or limited subgroups of the population. These subgroups may be obtained by dividing the population according to sex, age, race,

social condition, occupation, and so on. Specific death rates may be stated as the proportion of the number of deaths per annum in the subgroup per 1,000 of the mean annual number of the population in that subgroup. Sometimes specific death rates are given in terms of 10,000, 100,000, or 1,000,000 of the subgroup population.

Among the most important of the specific rates are those relating to age groups. Their significance is shown by the following statement of rates for the registration States of the United States for the year 1911:

Age group.	Death rate per 1,000.
Under 1 year	112.9
1 to 4 years	11.8
5 to 9 years	3.1
10 to 14 years	2.2
15 to 19 years	3.6
20 to 24 years	5.2
25 to 34 years	6.4
35 to 44 years	8.9
45 to 54 years	13.6
55 to 64 years	26.2
65 to 74 years	55.2
75 years and over	138.9
All ages	13.9

Specific race group rates are also important. In the registration area for deaths in 1911 the death rate for the white population was 13.7 and that of the colored 23.7 per 1,000, while the rate of the two groups taken together was 14.2 per 1,000.

The death rate differs also in the two sexes. In the registration area for deaths in 1911 the death rate for males was 14.7 and for females 13 per 1,000.

Standardized death rates.—Due to the wide variation in the death rates at different ages it is impossible to satisfactorily compare the crude death rates of populations differing in composition as regards the relative number of individuals in the several age groups. The International Statistical Institute recommended (1895) that to facilitate the comparison of death rates the population of Sweden as it existed in 1890 be used as a standard population for the statement of rates. Rates expressed in terms of a standard population are known as standardized or corrected rates. The method is as follows: Take the population for which it is desired to state the standardized death rate and ascertain the specific death rates of its several age groups. Now take the corresponding age groups in 1,000,000 of the standard population and compute the number of deaths that would have occurred in each age group at the specific death rate found to exist in the population for which the standard death rate is being computed; add the number of deaths which it is thus found would have occurred in the age groups of the standard population. This gives

the standardized rate per 1,000,000. The standardized rate per 1,000 is obtained by moving the decimal point three places to the left.

The standardized death rate is the rate which would have occurred in the standard population if the death rates in its several age groups had been the same as those of the corresponding age groups of the population under consideration.

The registrar general of births, marriages, and deaths of England and Wales has for some years taken for a standard the population composition of England and Wales as shown by the 1901 census. The population of Sweden of 1890 was divided without distinction of sex into the five age groups: Under 12 months of age, over 12

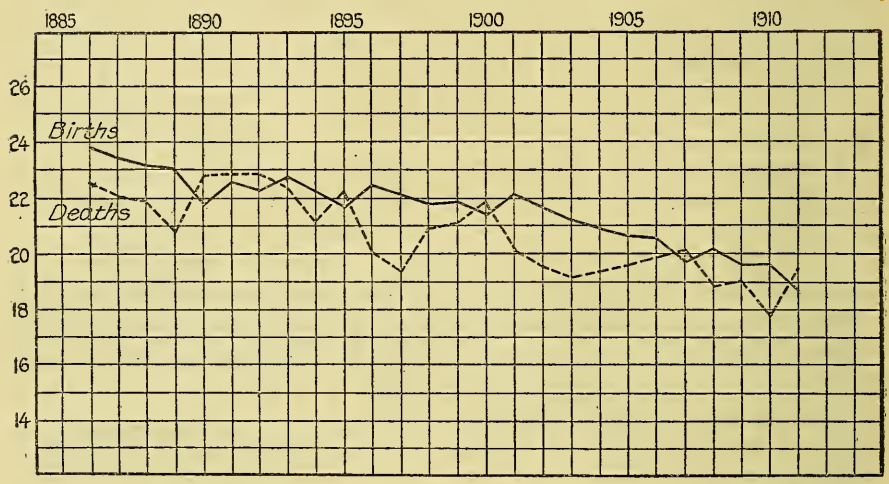

CHART 13.—Births and deaths (exclusive of stillbirths) per 1,000 population per annum—France—1886 to 1911.

months and under 20 years, 20 to 39 years of age inclusive, 40 to 59 years of age inclusive, and 60 years of age and over. The population of England and Wales is classified separately by sexes in quinquennial age groups and furnishes a much more delicate and exact standard for measurement. The use of the Swedish population standardizes for age; the use of the English standardizes for both age and sex. In the United States a standard would be useful which would standardize for age, sex, and race (white and colored).

Factors Affecting Death Rates.

Death rates are affected not only by the statistical methods used in their preparation and by the age, sex, and race composition of the population, the social, marital, and economic status of the people, the nature and conditions of employment and the adaptability of a people to their environment, but also in limited areas by a number of other factors, such as the location of hospitals and institutions.

Nonresidents—Hospitals and institutions.—Frequently a hospital or other institution will be located in one community while its patients or inmates will come largely from other places. The extent to which this is true depends upon the nature or reputation of the hospital or institution. The result may be that the local death rate will be affected to an appreciable extent by deaths of nonresidents in such institutions. In England and Wales an attempt has been made during the last two or three years to overcome this difficulty by the allocation of all deaths in so far as possible to the locality of usual

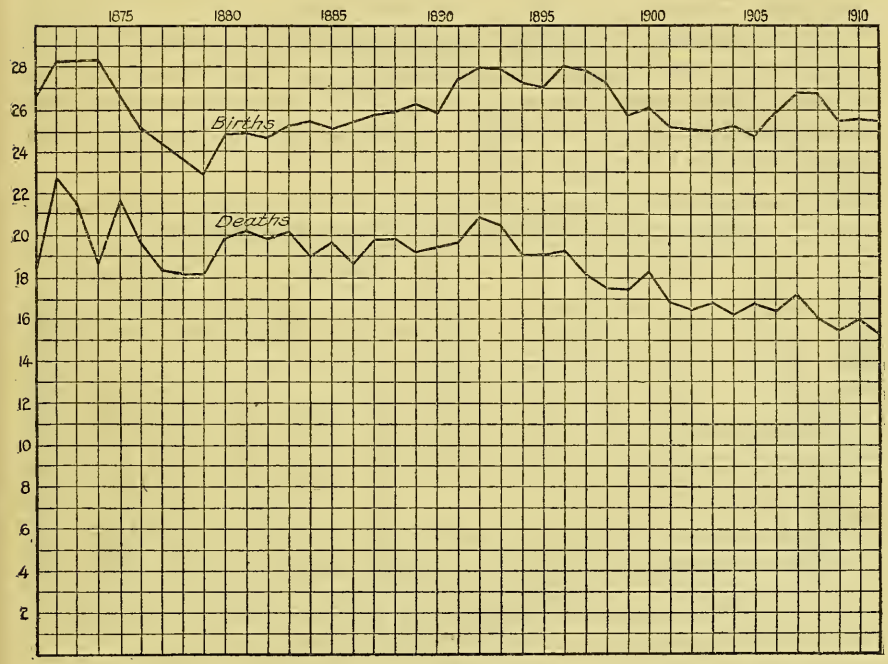

CHART 14.—Births and deaths (exclusive of stillbirths) per 1,000 population per annum—Massachusetts—1871 to 1911.

residence. In compiling deaths for a registration district or area for the purpose of showing death rates, erroneous results will be obtained if the deaths of nonresidents are excluded and no additions made for the deaths of residents which are continually occurring and being registered elsewhere. In the absence of a dependable means of including the deaths of residents occurring in other districts it is, unless under most exceptional circumstances, unsafe to exclude the deaths of nonresidents.

Migration.—Migration affects death rates by changing the age, sex, or race composition of the population. Migrants are likely to consist more largely of males than of females, of young adults than of the extremes of life. The effect of migration depends upon whether the balance is one of emigration or immigration and the nature of the migrants lost or gained.

Birth rate.—Ignoring the question of migration, a population increases because of the excess of births over deaths, natural increase. In a stationary population the birth rate equals the death rate. As all born must eventualy die the birth rate depends for its excess over the death rate upon the ever-increasing number of child-producing elements in the population and the resulting greater numbers in the younger age groups. Other things being equal, a community with a high birth rate will, because of the greater proportion of the population in the younger age groups, have a lower crude death rate than a community with a low birth rate.

Marital condition.—Mortality in certain countries seems to be more dependent on marital conditions than on sex. This is shown by the following table taken from a paper entitled "Some Researches Concerning the Factors of Mortality," by Lucien March (Journal of the Royal Statistical Society, London, March, 1912):

TABLE 7.—*Showing for the period 1886–1895, the number of deaths per 10,000 persons according to their marital status in France, Prussia, and Sweden.*

	Males, aged—			Females, aged—		
	20–39	40–59	60 and over.	20–39	40–59	60 and over.
France:						
Married	77	153	583	80	121	456
Single	103	246	794	78	166	730
Widowed or divorced	211	293	1,148	145	198	930
Prussia:						
Married	71	175	582	79	128	497
Single	84	231	806	59	179	729
Widowed or divorced	201	346	1,091	101	172	805
Sweden:						
Married	53	114	453	66	96	364
Single	83	204	690	61	120	528
Widowed or divorced	104	190	856	98	132	698

TABLE 8.—*Death rates (exclusive of stillbirths) per 1,000 population in certain countries, 1886 and 1911.*[1]

Country or State.	1886	1911
Australian Commonwealth	15.4	10.7
Austria	29.7	21.9
Denmark	18.1	13.6
England and Wales	19.5	14.6
Finland	22.2	16.5
France	22.5	19.6
German Empire	26.2	17.3
Hungary	31.7	25.1
Ireland	17.8	16.5
Italy	28.7	21.4
The Netherlands	21.8	14.5
New Zealand	10.5	9.3
Norway	16.2	13.2
Roumania	26.7	25.1
Scotland	18.9	15.1
Servia	29.6	21.8
Spain	29.3	23.2
Sweden	16.6	13.8
United States (registration area for deaths)	[2] 19.8	14.2
Connecticut	16.2	15.4
Massachusetts	18.6	15.3
Michigan	8.9	13.3

[1] Taken from the Seventy-fourth Annual Report of the Registrar General of Births, Deaths, and Marriages in England and Wales, 1911, except the rates for Connecticut, Massachusetts, Michigan, and the United States.

[2] Year 1880.

It will be noted in Table 8 that there has been a marked fall in the crude death rates throughout the civilized world. Louis I. Dublin,[1] statistician of the Metropolitan Life Insurance Co., has discussed the nature of this reduction in the death rate in the United States. He directs attention to the fact that the reduction has been entirely in the lower age groups, and that the death rates for the ages above 45 in males and above 55 in females were higher in 1911 than in 1900. The following table illustrating the nature of the changes is taken from Dublin's paper:

TABLE 9.—*Comparison of mortality of males and females, by age groups; death rates per 1,000 population. (Dublin.)*

[Registration States as constituted in 1900.]

Age.	Males.			Females.		
	1900	1911	Per cent increase or decrease.	1900	1911	Per cent increase or decrease.
Under 5	54.2	39.8	−26.57	45.8	33.3	−27.29
5–9	4.7	3.4	−27.66	4.6	3.1	−32.61
10–14	2.9	2.4	−17.24	3.1	2.1	−32.26
15–19	4.9	3.7	−24.49	4.8	3.3	−31.25
20–24	7.0	5.3	−24.29	6.7	4.7	−29.85
25–34	8.3	6.7	−19.28	8.2	6.0	−26.83
35–44	10.8	10.4	− 3.70	9.8	8.3	−15.31
45–54	15.8	16.1	+ 1.90	14.2	12.9	− 9.15
55–64	28.9	30.9	+ 6.92	25.8	26.0	+ 0.78
65–74	59.6	61.6	+ 3.36	53.8	55.1	+ 2.42
75 and over	146.1	147.4	+ .89	139.5	139.2	− 0.22
All ages	17.6	15.8	−10.23	16.5	14.0	−15.15

Similarly instructive is the following taken from a table prepared by Guilfoy[2] showing the difference in the mortality rates for the various age groups in 1868 and in 1907 in the city of New York.

TABLE 10.—*Death rates per 1,000 persons at different age periods in New York City, with increase or decrease percentage from all causes for the years 1868 and 1907. (Guilfoy.)*

	Rates.		Per cent, increase or decrease.
	1868	1907	
Males:			
Under 5 years	130.6	57.85	−56
5–9	10.1	4.58	−55
10–14	5.04	2.68	−47
15–19	6.14	5.24	−15
20–24	13.42	7.62	−43
25–29	16.21	9.42	−42
30–34	18.01	12.50	−31
35–44	20.32	18.25	−10
45–54	26.36	31.84	+21
55–64	42.15	49.87	+18
65 and over	103.71	107.1	+ 3
All ages	32.12	21.13	−34

[1] Dublin, Louis I. "Possibilities of reducing mortality at the higher age groups," Americal Journal of Public Health, Dec., 1913.

[2] Guilfoy, Wm. H., "At what age periods and in what measure has the reduction in the mortality rate from tuberculosis manifested itself in the city of New York during the past forty years?" New York Med. Jour.; Nov. 28, 1908.

TABLE 10.—*Death rates per 1,000 persons at different age periods in New York City, with increase or decrease percentage from all causes for the years 1868 and 1907 (Guilfoy)*—Continued.

	Rates.		Per cent, increase or decrease.
	1868	1907	
Females:			
Under 5 years	118.9	49.57	−58
5–9	9.08	3.74	−59
10–14	3.36	2.75	−18
15–19	5.74	4.14	−28
20–24	10.91	5.45	−50
25–29	12.84	6.82	−47
30–34	14.24	8.85	−38
35–44	15.83	12.44	−21
45–54	17.69	19.67	+11
55–64	29.37	38.43	+31
65 and over	88.40	97.30	+10
All ages	26.52	16.53	−38
Both sexes:			
Under 5 years	124.8	53.74	−57
5–9	9.60	4.16	−57
10–14	4.19	2.72	−35
15–19	5.92	4.65	−21
20–24	12.03	6.43	−47
25–29	14.42	8.11	−44
30–34	16.13	10.77	−33
35–44	18.08	15.54	−14
45–54	22.10	25.90	+17
55–64	35.59	44.06	+24
65 and over	94.84	101.7	+ 7
All ages	29.24	18.97	−35

INFANTILE MORTALITY.

Infantile mortality is the mortality of infants under 1 year of age. While the specific death rates for other age groups are given as the ratio of the number of deaths to the number of individuals in the age group as ascertained by census enumeration and estimated for intercensal and post censal years, it is not practicable to do this for the first year of life. There is extreme difficulty in ascertaining by enumeration the infant population. This is due largely to confusion of the current year of age with the completed year of life. Many infants less than 12 months old are returned at the census as 1 year of age. This causes an understatement of the infant population and gives an illusory basis for the estimation of infant mortality rates.

The commonly accepted method of stating infant mortality is as the ratio of deaths of children under 1 year of age to living births, and is usually expressed as the proportion of deaths during the calendar year to 1,000 living births during the same period. To illustrate: If in a city there were during a year 224 deaths of infants under 1 year of age, and if during the same year there were 2,000 births, the infantile mortality rate would be 112 per 1,000 births per annum.

Infantile mortality rates might be based upon the number of births during the preceding year or upon the mean of the number of births of the current year and the preceding year. However, the number of births of the current year has been accepted as the basis in Great Britain and many other countries.

Making the estimation of infantile mortality depend upon birth registration is at present unfortunate in a way for those interested

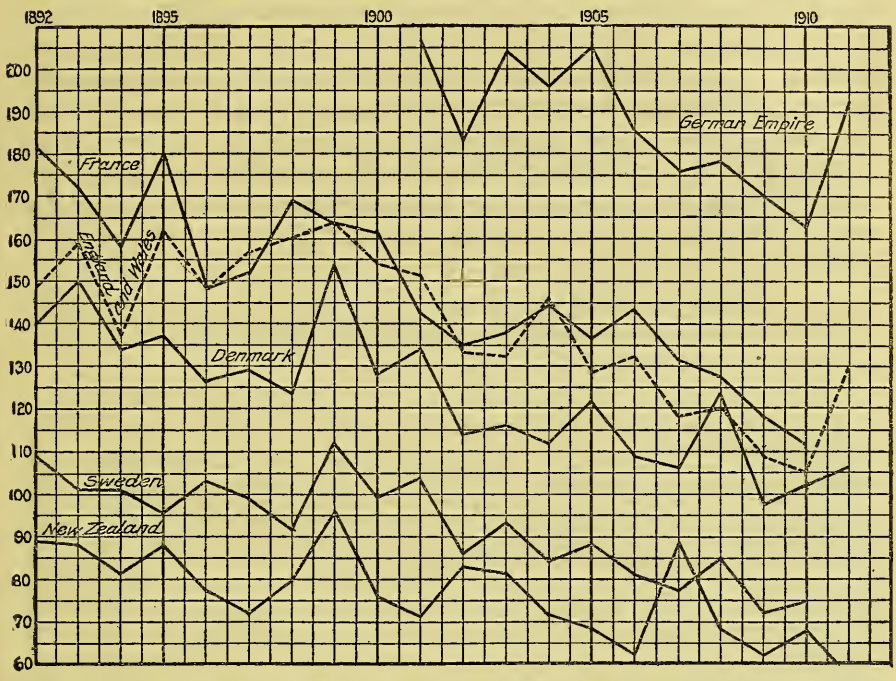

CHART 15.—Infantile mortality (deaths of infants under 1 year of age per 1,000 births per annum, exclusive of stillbirths)—German Empire, France, England and Wales, Denmark, Sweden, and New Zealand—1892 to 1911.

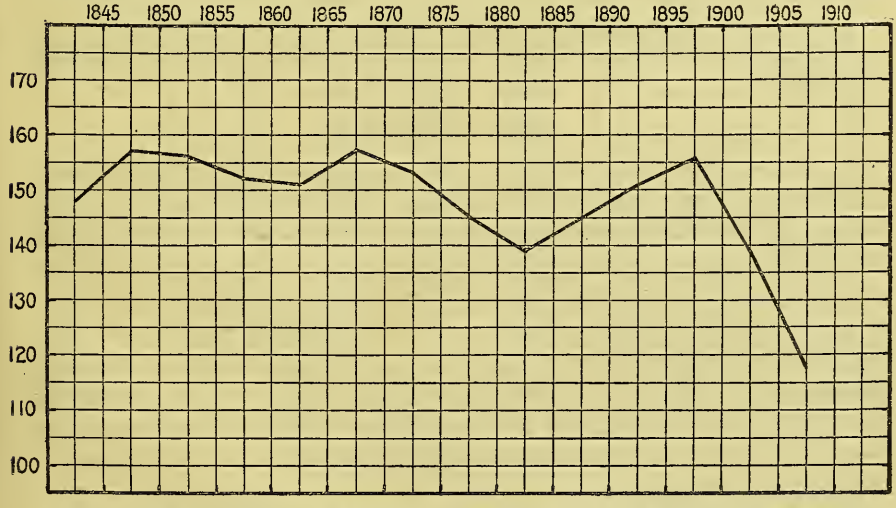

CHART 16.—Infantile mortality (deaths of infants under 1 year of age per 1,000 births per annum, exclusive of stillbirths)—England and Wales—1840 to 1910. The curve shows the mean annual rate for quinquennial periods.

in the subject as it relates to the United States, owing to deficient birth registration in this country and the impossibility therefore of

estimating infantile mortality rates, except for certain limited areas. However, there is no other practicable basis for estimation. There are, too, other difficulties to be encountered in the use of incomplete birth registration. In the absence of change in other factors an improving completeness of birth registration would give an apparent decreasing infantile mortality rate and might lead to unwarranted deductions. For a further discussion of the subject the reader is referred to a paper entitled, "Certain phases and fallacies of American infant mortality statistics," by Edward Bunnell Phelps,[1] in the American Journal of Public Health, Volume III, No. 11, November, 1913.

TABLE 11.—*Infantile mortality—Deaths of children under 1 year of age per 1,000 births (exclusive of stillbirths) in certain countries, 1892 and 1911.*[1]

Country or State.	1892	1911
Australian Commonwealth	106	68
Austria	259	207
Denmark	140	106
England and Wales	148	130
Finland	170	114
France	181	[2] 111
German Empire	.....	192
Hungary	274	207
Ireland	105	94
Italy	184	[2] 142
The Netherlands	174	137
New Zealand	89	56
Norway	105	[2] 67
Roumania	243	197
Scotland	117	[2] 108
Servia	196	[2] 138
Sweden	109	[2] 75
Connecticut	.....	115
Massachusetts	161	119

[1] Taken from the seventy-fourth annual report of the registrar general of births, deaths, and marriages in England and Wales, 1911, except the rates for Connecticut and Massachusetts, which were taken from State reports.
[2] Year 1910.

LIFE TABLES.

In theory life tables represent the duration of life of individuals born at the same time. Given a group of individuals born in any one year and a life table will show the number in the group that will still be alive in each succeeding year as long as any remain. It will also show the number who will have died previous to any given year and the number dying during each year. To observe a group of individuals from the cradle to the grave is under most conditions impracticable, and besides yields information the value of which is largely lost before it is obtained, for conditions affecting longevity may change and the life history of one generation may be quite different from that of the next.

[1] Other papers on the subject by the same author are: "A statistical survey of infant mortality's urgent call for action," Transactions Am. Assn. for study and prevention of infant mortality, 1910. "A statistical study of infant mortality," Quarterly publications, Am. Statistical Assn., Sept., 1908. "Infant mortality and its relation to woman's employment: A study of Massachusetts statistics," S. Doc. No. 645, 61st Cong., 2d sess., 1912.

Much of the value of a life table consists in showing current conditions as they affect the longevity of the community or race. For this purpose tables are constructed from the information furnished by an enumeration of the population (census) classified by age and sex and the registration of deaths with the decedents classified also by age and sex. The population age and sex groups give the number and proportion remaining alive at each year of age, the deaths show the number dying at each year of age. For the purpose of getting data which show general conditions prevailing during the period, and of avoiding the errors which might arise by using the death records of a year during which unusual mortality conditions prevailed, the death records for a number of consecutive years are usually used.

Given the above data, the expectancy of life or mean after lifetime at a given age is readily obtained. The following table is one prepared under the direction of Dr. William H. Guilfoy, registrar of records of the New York City department of health and published in the monthly bulletin of the department for May, 1913. It compares the expectation of life based on the mortality experience of the three years 1909, 1910, and 1911, with that found by the late John S. Billings based upon the experience of 1879, 1880, and 1881:

TABLE 12.—*Approximate life tables for the city of New York based on mortality returns for the triennials 1879 to 1881 and 1909 to 1911.* (*Guilfoy.*)

Years of mortality.	Expectation of life, 1879 to 1881.			Expectation of life, 1909 to 1911.			Gain (+) or loss (−) in years of expectancy.		
	Males.	Females.	Persons.	Males.	Females.	Persons.	Males.	Females.	Persons.
Ages:									
— 5	39.7	42.8	41.3	50.1	53.8	51.9	+10.4	+11.0	+10.6
5	44.9	47.7	46.3	49.4	52.9	51.1	+ 4.5	+ 5.2	+ 4.8
10	42.4	45.3	43.8	45.2	48.7	46.9	+ 2.8	+ 3.4	+ 3.1
15	38.2	41.2	39.7	40.8	44.2	42.5	+ 2.6	+ 3.0	+ 2.8
20	34.4	37.3	35.8	36.6	40.0	38.3	+ 2.2	+ 2.7	+ 2.5
25	31.2	34.0	32.6	32.7	36.0	34.3	+ 1.5	+ 2.0	+ 1.7
30	28.2	31.0	29.6	28.9	32.1	30.5	+ 0.7	+ 1.1	+ 0.9
35	25.3	28.1	26.7	25.4	28.4	26.9	+ 0.1	+ 0.3	+ 0.2
40	22.5	25.2	23.9	22.1	24.7	23.4	− 0.4	− 0.5	− 0.5
45	19.8	22.4	21.1	18.9	21.1	20.0	− 0.9	− 1.1	− 1.1
50	17.2	19.4	18.3	15.9	17.7	16.8	− 1.3	− 1.7	− 1.5
55	14.5	16.4	15.4	13.2	14.6	13.9	− 1.3	− 1.8	− 1.5
60	12.2	13.8	13.0	10.8	11.8	11.3	− 1.4	− 2.0	− 1.7
65	9.9	11.2	10.5	8.8	9.4	9.1	− 1.1	− 1.8	− 1.4
70	8.5	9.3	8.9	6.9	7.5	7.2	− 1.6	− 1.8	− 1.7
75	7.1	7.5	7.3	5.3	5.7	5.5	− 1.8	− 1.8	− 1.8
80	6.2	6.5	6.4	4.1	4.5	4.3	− 2.1	− 2.0	− 2.1
+85	5.4	5.5	5.5	2.0	2.4	2.2	− 3.4	− 3.1	− 3.3
Balance							+24.8 −15.3 + 9.5	+28.7 −17.6 +11.1	+26.6 −16.6 +10.0

ACKNOWLEDGMENTS.

It is a pleasure to the author to acknowledge his indebtedness to Drs. Cressy L. Wilbur, William H. Guilfoy, John S. Fulton, and Charles F. Bolduan for many helpful suggestions.

APPENDIX.

EARLY REGISTRATION IN ENGLAND.

ORDER OF THOMAS CROMWELL, VICAR GENERAL UNDER HENRY VIII (1538) REQUIRING THE CLERGY TO RECORD BAPTISMS, MARRIAGES, AND BURIALS.

"In the name of God Amen. By the authorite and commission of the most excellent Prince Henry by the Grace of God Kynge of Englande and of France, defensor of the faithe Lorde of Irelande, and in erthe supreme hedd undre Christ of the Church of Englande, I Thomas lorde Cromwell, lorde privie seall, Vicegerent within this realme, do for the advancement of the trewe honor of almighty God, encrease of vertu and discharge of the kynges majestie, give and exhibite unto you theise injunctions folowing, to be kept observed and fulfilled upon the paynes hereafter declared. . . . . .

"That you and every parson vicare or curate within this diocese shall for every churche kepe one boke or registere wherein ye shall write the day and yere of every weddyng christenyng and buryeng made within yor parishe for your tyme, and so every man succeedyng you lykewyse. And shall there insert every persons name that shalbe so weddid christened or buried. And for the sauff kepinge of the same boke the parishe shalbe bonde to provide of these comen charges one sure coffer with twoo lockes and keys whereof the one to remayne with you, and the other with the said wardens, wherein the saide boke shalbe laide upp. Whiche boke ye shall every Sonday take furthe and in the presence of the said wardens or one of them write and recorde in the same all the weddinges christenynges and buryenges made the hole weke before. And that done to lay upp the boke in the said coffer as afore. And for every tyme that the same shalbe omytted the partie that shalbe in the faulte thereof shall forfett to the saide churche 111s 111d to be emploied on the reparation of the same churche. . . .

"THOMAS CRUMWELL."

THE MODEL STATE LAW FOR MORBIDITY REPORTS.

ADOPTED BY THE ELEVENTH ANNUAL CONFERENCE OF STATE AND TERRITORIAL HEALTH AUTHORITIES WITH THE UNITED STATES PUBLIC HEALTH SERVICE, MINNEAPOLIS, JUNE 16, 1913.

A Bill To provide for the notification of the occurrence and prevalence of certain diseases.

Be it enacted by the Senate and General Assembly of the State of———:

SECTION 1. It shall be, and is hereby, made the duty of the State department of health (or commissioner or board of health) to keep currently informed of the occurrence, geographic distribution, and prevalence of the preventable diseases throughout the State, and for this purpose there shall be established in the State department of health a bureau (or division) of sanitary reports which shall, under the direction of the State commissioner of health (State health officer or secretary of the State board of health), be in charge of an assistant commissioner of health who shall receive an annual salary of ——— dollars and the necessary expenses incurred in the performance of his duties. The State department of health shall provide such clerical and other assistance as may be necessary for the establishment and maintenance of said bureau.

SEC. 2. The following-named diseases and disabilities are hereby made notifiable and the occurrence of cases shall be reported as herein provided:

GROUP I.—INFECTIOUS DISEASES.

Actinomycosis.
Anthrax.
Chicken-pox.
Cholera. Asiatic (also cholera nostras when Asiatic cholera is present or its importation threatened).
Continued fever lasting seven days.
Dengue.
Diphtheria.
Dysentery:
(*a*) Amebic.
(*b*) Bacillary.
Favus.
German measles.
Glanders.
Hookworm disease.
Leprosy.
Malaria.
Measles.
Meningitis:
(*a*) Epidemic cerebrospinal.
(*b*) Tuberculous.
Mumps.
Ophthalmia neonatorum (conjunctivitis of newborn infants).
Paragonimiasis (endemic hemoptysis).
Paratyphoid fever.
Plague.
Pneumonia (acute).
Poliomyelitis (acute infectious).
Rabies.
Rocky Mountain spotted, or tick, fever.
Scarlet fever.
Septic sore throat.
Smallpox.
Tetanus.
Trachoma.
Trichinosis.
Tuberculosis (all forms, the organ or part affected in each case to be specified).
Typhoid fever.
Typhus fever.
Whooping cough.
Yellow fever.

GROUP II.—OCCUPATIONAL DISEASES AND INJURIES.

Arsenic poisoning.
Brass poisoning.
Carbon monoxide poisoning.
Lead poisoning.
Mercury poisoning.
Natural gas poisoning.
Phosphorus poisoning.
Wood alcohol poisoning.
Naphtha poisoning.
Bisulphide of carbon poisoning.
Dinitrobenzine poisoning.
Caisson disease (compressed-air illness).
Any other disease or disability contracted as a result of the nature of the person's employment.

GROUP III.—VENEREAL DISEASES.

Gonococcus infection.

Syphilis.

GROUP IV.—DISEASES OF UNKNOWN ORIGIN.

Pellagra.
Cancer.

Provided, That the State department of health (or board of health) may from time to time, in its discretion, declare additional diseases notifiable and subject to the provisions of this act.

SEC. 3. Each and every physician practicing in the State of ——— who treats or examines any person suffering from or afflicted with, or suspected to be suffering from or afflicted with, any one of the notifiable diseases shall immediately report such case of notifiable disease in writing to the local health authority having jurisdiction. Said report shall be forwarded either by mail or by special messenger and shall give the following information:

1. The date when the report is made.
2. The name of the disease or suspected disease.
3. The name, age, sex, color, occupation, address, and school attended or place of employment of patient.
4. Number of adults and of children in the household.
5. Source or probable source of infection or the origin or probable origin of the disease.
6. Name and address of the reporting physician.

Provided, That if the disease is, or is suspected to be, smallpox the report shall, in addition, show whether the disease is of the mild or virulent type and whether the patient has ever been successfully vaccinated, and, if the patient has been successfully vaccinated, the number of times and dates or approximate dates of such vaccination; and if the disease is, or is suspected to be, cholera, diphtheria, plague, scarlet fever, smallpox, or yellow fever, the physician shall, in addition to the written report,

give immediate notice of the case to the local health authority in the most expeditious manner available; and if the disease is, or is suspecteed to be, typhoid fever, scarlet fever, diphtheria, or septic sore throat the report shall also show whether the patient has been, or any member of the household in which the patient resides is, engaged or employed in the handling of milk for sale or preliminary to sale: *And provided further*, That in the reports of cases of the venereal diseases the name and address of the patient need not be given.

SEC. 4. The requirements of the preceding section shall be applicable to physicians attending patients ill with any of the notifiable diseases in hospitals, asylums, or other institutions, public or private: *Provided*, That the superintendent or other person in charge of any such hospital, asylum, or other institution in which the sick are cared for may, with the written consent of the local health officer (or board of health) having jurisdiction, report in the place of the attending physician or physicians the cases of notifiable diseases and disabilities occurring in or admitted to said hospital, asylum, or other institution in the same manner as that prescribed by physicians.

SEC. 5. Whenever a person is known, or is suspected, to be afflicted with a notifiable disease, or whenever the eyes of an infant under two weeks of age become reddened, inflamed, or swollen, or contain an unnatural discharge, and no physician is in attendance, an immediate report of the existence of the case shall be made to the local health officer by the midwife, nurse, attendant, or other person in charge of the patient.

SEC. 6. Teachers or other persons employed in, or in charge of, public or private schools, including Sunday schools, shall report immediately to the local health officer each and every known or suspected case of a notifiable disease in persons attending or employed in their respective schools.

SEC. 7. The written reports of cases of the notifiable disease required by this act of physicians shall be made upon blanks supplied for the purpose, through the local health authorities, by the State department of health. These blanks shall conform to that adopted and approved by the State and Territorial health authorities in conference with the United States Public Health Service.

SEC. 8. Local health officers or boards of health shall within seven days after the receipt by them of reports of cases of the notifiable diseases forward by mail to the State department of health the original written reports made by physicians, after first having transcribed the information given in the respective reports in a book or other form of record for the permanent files of the local health office. On each report thus forwarded the local health officer shall state whether the case to which the report pertains was visited or otherwise investigated by a representative of the local health office and whether measures were taken to prevent the spread of the disease or the occurrence of additional cases.

SEC. 9. Local health officers or boards of health shall, in addition to the provisions of section 8, report to the State department of health in such manner and at such times as the State department of health may require by regulation the number of new cases of each of the notifiable diseases reported to said local health officers or boards of health.

SEC. 10. Whenever there occurs within the jurisdiction of a local health officer or board of health an epidemic of a notifiable disease, the local health officer or board of health shall, within 30 days after the epidemic shall have subsided, make a report to the State department of health of the number of cases occurring in the epidemic, the number of cases terminating fatally, the origin of the epidemic, and the means by which the disease was spread: *Provided*, That whenever the State department of health has taken charge of the control and suppression or undertaken the investigation of the epidemic, the local health authority having jurisdiction need not make the report otherwise required.

SEC. 11. No person shall be appointed to the position of local health officer in any city, town, or county until after the qualifications of said person have been approved by the State department of health.

SEC. 12. In localities in which there are no local health officers or boards of health, and in localities in which, although there are health officers or boards of health, adequate provision has not, in the opinion of the State department of health, been made for the proper notification, investigation, and control of notifiable disease, and in localities in which the local health authorities fail to carry out the provisions of this act, the State department of health shall appoint properly qualified sanitary officers to act as local health officers and to prevent the spread of disease in and from such localities and to enforce the provisions of this act: *Provided*, That salaries and other expenses incurred under the provisions of this section shall be paid by the local authorities.

SEC. 13. Any physician or other person or persons who shall fail, neglect, or refuse to comply with, or who shall violate any of the provisions of this act shall be guilty of a misdemeanor, and upon conviction thereof shall be sentenced to pay a fine of not less than ——— dollars nor more than ——— dollars or to imprisonment for not less than ——— days nor more than ——— days for each offense: *Provided*, That in the case of a physician his license to practice medicine within the State may be revoked in accordance with existing statutory provisions.

SEC. 14. No license to practice medicine shall be issued to any person until after the applicant shall have filed with the State licensing board a statement, signed and sworn to before a notary or other officer qualified to administer oaths, that said applicant has familiarized himself with the requirements of this act, a copy of which sworn statement shall be forwarded to the State department of health.

SEC. 15. Each and every person engaged in the practice of medicine shall display in a prominent place in his or her office a card upon which sections 2, 3, 4, 7, 13, 14, and 15 of this act have been printed with type not smaller than 10-point. A similar card shall be displayed in a prominent place in the office of each and every hospital, asylum, or other public or private institution for the treatment of the sick. These cards shall each be not less than 1 square foot in size and shall be furnished to institutions and licensed physicians without cost by the State department of health.

SEC. 16. The sum of ——— dollars is hereby appropriated from any money in the State treasury not otherwise appropriated for carrying out the provisions of this act.

SEC. 17. This act shall take effect immediately, and all acts or parts of acts inconsistent with the provisions of this act are hereby repealed.

THE STANDARD MORBIDITY NOTIFICATION BLANK.

The following model notification blank was also adopted by the conference of state and territorial health authorities with the United States Public Health Service June 16, 1913, as the standard notification blank referred to in section 7 of the Model Law as the one to be used in the reporting of cases of the notifiable diseases. This blank is intended to be printed on a post card:

[Face of card.]

....., 191...
(Date.)

Disease or suspected disease.....
Patient's name....., age....., sex....., color.....
Patient's address....., occupation.....
School attended or place of employment.....
Number in household: Adults....., children.....
Probable source of infection or origin of disease.....
If disease is smallpox, type....., number of times successfully vaccinated and approximate dates.....
If typhoid fever, scarlet fever, diphtheria, or septic sore throat, was patient, or is any member of household engaged in the production or handling of milk.....
Address of reporting physician.....
Signature of physician.....

[Reverse of card.]

For use of local health department.

Was case investigated by health department? (Date.) ....., 191...

Was nature of disease verified? .....

What measures were taken to prevent the spread or the occurrence of additional cases from same origin? .....

.....

.....

Health Department,
(City).....
(State).....

HOSPITAL DISCHARGE CERTIFICATE.

Suggested by Bolduan for use in connection with hospital morbidity reports.

DISCHARGE CERTIFICATE.

Name of hospital..... Hospital admission No.....
Sex.....Age.....

How admitted—Ambulance
or
own application
or
(Tabulation No.) transfer from other hospital.

White. Hebrew.
Colored. Gentile.
Mongolian.

Place of birth.....

Patient's address.....
.....Borough.....
Date admitted.....
Date discharged.....
Days in hospital.....months.....
days.....
(If over a year, omit the days and give only years and months.)

Single or married or widowed or divorced or unknown.
Discharged to—
Home.
Other hospital.
Convalescent retreat.
Coroner.

Occupation—(*a*) Trade, profession, or particular kind of work.
.....

(*b*) General nature of the industry, business, or establishment in which employed (or employer).
.....

Diagnosis.....
and
Complications.....
If operated upon, state nature of operation.....
Condition on discharge: Cured. Improved. Unimproved.
Died—Autopsy.
No autopsy.
Signed .....
House Physician—Surgeon.

NOTIFICATION OF OCCUPATIONAL DISEASES, UNITED STATES.

Abstracts of the State Laws and Regulations.

CALIFORNIA.

Medical practitioners are to report all cases among their patients of poisoning by lead, phosphorus, arsenic, or mercury or their compounds, of anthrax and of compressed-air illness, contracted as a result of the nature of the patient's employment. These reports are to be made at once to the State board of health and to give the name, address, and place of employment of the patient, and name of the disease from which the patient is supposed to be suffering.

Physicians are entitled to a fee of 50 cents for each report forwarded.

Willful failure on the part of a physician to report is made a misdemeanor punishable by a fine of not more than $10.

The law is to be enforced by the State board of health, which may call upon local health authorities for assistance.

The State board of health upon receipt of reports of occupational diseases as above described is to transmit the data to the commissioner of the bureau of labor statistics. (Chap. 485, Acts of 1911.)

CONNECTICUT.

Physicians are to report all cases known to them of occupational diseases, that is, diseases contracted as a result of the nature of the patient's employment. The law names specifically poisoning from lead, phosphorus, arsenic, brass, wood alcohol, and mercury and their compounds, anthrax and compressed-air illness. The reports are to be made within 48 hours by mail to the commissioner of the bureau of labor statistics and are to show the name, address, and occupation of the patient, the name, address, and business of the patient's employer, the nature of the disease, and such other information as may be required by the commissioner. Blank forms upon which to make these reports are furnished by the bureau of labor statistics.

Failure on the part of a physician to report within the time specified is made punishable by a fine of not to exceed $10. (Chap. 14, Act approved Apr. 22, 1913.)

ILLINOIS.

In the Illinois law industries in which sugar of lead, white lead, lead chromate, litharge, red lead, or arsenate of lead are used or handled in any way, and industries engaged in the manufacture of brass or the smelting of lead or zinc are declared to be especially dangerous to the health of the employees. Employers engaged in carrying on these industries are required to cause all employees who come in direct contact with the poisonous agencies or injurious processes to be examined once a month by a physician to ascertain whether there exists in the employees any occupational disease or illness due or incident to the character of their work. The physicians making these examinations are to report immediately to the State board of health. If no occupational disease is found, the report is to so state. If a case of occupational disease is found, the report is to state the name, address, sex, age, and last place of employment of the employee affected, the name of the employer, and the nature of the disease and its probable extent and duration. Upon the receipt of such a report the secretary of the State board of health is to immediately transmit a copy of it to the Illinois department of factory inspection. (Act approved May 26, 1911; effective July 1, 1911.)

KANSAS.

The State Board of Health of Kansas by regulations, adopted December 13, 1913, made the following occupational diseases notifiable to the State health department through the local health departments in the same manner as the other notifiable

diseases: Arsenic poisoning, brass poisoning, carbon monoxide poisoning, lead poisoning, mercury poisoning, natural gas poisoning, phosphorus poisoning, wood alcohol poisoning, naphtha poisoning, bisulphide of carbon poisoning, dinitrobenzine poisoning, caisson disease (compressed-air illness). Any other disease or disability contracted as a result of the nature of the person's employment.

MAINE.

Physicians are to report all cases among their patients of poisoning from lead, phosphorus, arsenic, or mercury, or their compounds, of anthrax, of compressed-air illness, or of any other disease or ailment contracted as a result of the patient's occupation or employment. The reports are to be made in writing to the State board of health within 10 days after first seeing the patient, and are to give the name, address, nature of the occupation and place of employment of the patient, the nature of the disease, and such other information as may be required by the State board of health. In like manner physicians are to report all cases of lead poisoning or suspected lead poisoning resulting from the use of water suspected of containing lead.

Failure on the part of the physician to make these reports is made a misdemeanor punishable by a fine of not less than $5 nor more than $10.

The enforcement of the law is imposed on the State board of health and the county attorneys. (Chap. 82, act approved Mar. 20, 1913.)

MARYLAND.

Physicians are required to report all cases in which the patients are believed to be suffering from poisoning from lead, phosphorus, arsenic or mercury or their compounds, or from anthrax or compressed-air illness, or from any other ailment contracted as a result of the nature of the patient's employment. These reports are to be made at once in writing to the State board of health and are to give the name, address, occupation, and place of employment of the patient, the nature of the disease, and such other information as may be required by the State board of health.

The State board of health is to enforce the act and to transmit the data received in the reports from physicians to the chief of the Maryland bureau of statistics and information.

Failure on the part of a physician to make the required reports renders him liable to a fine of not to exceed $5. (Act approved Apr. 8, 1912.)

MASSACHUSETTS.

The State board of labor and the industrial accident board, sitting jointly, are to make regulations for the prevention of occupational diseases and are given the authority to require physicians to report all cases among their patients of diseases contracted as a result of the nature, circumstances, or conditions of the patient's employment, and to fix the information to be furnished and the time within which such reports shall be made. These reports are to be made to the State board of labor and industries.

Violations of any regulations made as described above are punishable by a fine of not more than $100 for each offense. (Act approved June 16, 1913.)

MICHIGAN.

Physicians are to report all cases among their patients of poisoning from lead, phosphorus, arsenic or mercury or their compounds, of anthrax or of compressed-air illness, contracted as a result of the nature of the patient's employment. These reports are to be made to the State board of health and are to give the name, address, and place and duration of employment of the patient and the nature of the disease from which, in the opinion of the physician, the patient is suffering.

The State board of health is to transmit these reports to the commissioner of labor.

Failure on the part of a physician to make these reports is made a misdemeanor punishable by a fine of not more than $5.

It is made the duty of the commissioner of labor and the county attorneys to prosecute violations of the law. (Act approved Apr. 25, 1911.)

MINNESOTA.

Physicians are to report all cases in which the patient is believed to be suffering from poisoning from lead, phosphorus, arsenic or mercury or their compounds, or from anthrax or compressed-air illness, contracted as a result of the nature of the patient's employment. The reports are to be made at once to the commissioner of labor and are to give the name, address, and place of employment of the patient, the nature of the disease, and such other information as may be required by the commissioner of labor.

Enforcement of the law is made the duty of the commissioner of labor, who may call upon the State and local boards of health for assistance.

Failure on the part of a physician to make the required reports is made a misdemeanor, punishable by a fine of not more than $10 or by imprisonment for not exceeding 10 days. (Act approved Feb. 25, 1913; effective after July, 1913.)

MISSOURI.

Employees engaged in manufacture in which antimony, arsenic, brass, copper, lead, mercury, phosphorus, zinc, their alloys or salts or any poisonous chemicals, minerals, acids, fumes, vapors, gases or other substances are generated, used, or handled by employees in harmful quantities, or under harmful conditions, are required at least once a month to cause all employees coming into direct contact with the poisonous agencies to be examined by a physician to ascertain whether there exists in the employees any disease due or incident to the character of the work in which the employees are engaged. The physicians making these examinations are to make within 24 hours a report to the State board of health in triplicate upon blanks furnished by said board. If disease incident to occupation is found, the report is to state the name, address, and business of the employer, the nature of the disease, and its probable extent and duration, the name of the employee and his last place and length of employment.

Upon receipt of these reports the secretary of the State board of health is to send one copy to the State factory inspector and one copy to the superintendent of the factory in which the employee is supposed to have contracted his ailment.

The enforcement of the law is made the duty of the State factory inspector.

Failure on the part of a physician to make the required reports is made a misdemeanor punishable by a fine of not less than $50. (Act approved Mar. 27, 1913; effective June 23, 1913.)

NEW HAMPSHIRE.

Physicians are to report all cases among their patients believed to be suffering from poisoning from lead, phosphorus, arsenic, brass, wood alcohol, or mercury or their compounds or from anthrax or compressed-air illness or any other ailment contracted as a result of the nature of the patient's employment. These reports are to be made to the State board of health within 48 hours and are to give the name, address, and occupation of the patient, the name, address, and business of the employer, the nature of the disease, and such other information as may be required by the State board of health.

The State board of health is to prepare and issue blank forms on which the reports are to be made by physicians and is to transmit copies of reports received to the commissioner of labor.

Violations of the law on the part of physicians are made punishable by a fine of $5 for each offense. (Act approved May 7, 1913; effective July 1, 1913.)

NEW JERSEY.

Physicians are to report all cases in which the patients are believed to be suffering from poisoning from lead, phosphorus, arsenic, or mercury or their compounds, or from anthrax or compressed-air illness contracted as a result of the patient's employment. The reports are to be made in writing to the State board of health within 30 days after the first visit and are to give the name, address, occupation, and place of employment of the patient, the name of the disease and such other information as may be required by the State board of health.

The enforcement of the law is made the duty of the State board of health which is to transmit the data received in the reports of physicians to the commissioner of labor.

Failure to report renders a physician liable to a fine of $25 for each offense. (Act approved Apr. 1, 1913.)

NEW YORK.

Medical practitioners are to report all cases in which the patients are believed to be suffering from poisoning from lead, phosphorus, arsenic, brass, wood alcohol, or mercury or their compounds, or from anthrax or compressed-air illness, contracted as the result of the nature of the patient's employment. These reports are to be made at once to the commissioner of labor and are to give the name, address, and place of employment of the patient, the name of the disease, and such other information as may be required by the commissioner.

The enforcement of the law is made the duty of the commissioner of labor who is authorized to call upon the State and local boards of health for assistance.

Failure to report renders a physician liable to a fine of not to exceed $10. (Act approved June 6, 1911; effective Sept. 1, 1911; amended by chap. 145; approved Mar. 28, 1913.)

OHIO.

The Ohio law enacted April 23, 1913, is the same as that of New Hampshire with the exception that there is no penalty for violations, and the State board of health is to transmit copies of reports received to "the proper officials having charge of factory inspection" instead of to the "commissioner of labor" as in New Hampshire.

A law enacted May 6, 1913, and effective October 1, 1913, requires employers to have all employees who are engaged in the manufacture of white lead, red lead, litharge, sugar of lead, arsenate of lead, lead chromate, lead sulphate, lead nitrate, or fluosilicate and are exposed to lead dusts, fumes, or solutions, examined at least once a month by a physician to ascertain whether there exist symptoms of lead poisoning. If symptoms believed to be due to lead poisoning are found, the examining physician is to make within 48 hours a report in duplicate and send one copy to the State board of health and the other to the State department of factory inspection. The reports are to be upon or in conformity with blanks furnished for the purpose by the State board of health, and are to give the name, occupation, and address of the employee, the name, business, and address of the employer, the nature and probable extent of the disease, and such other information as may be required by the State board of health. The examining physician is also to report his findings within 48 hours to the employer.

The law is to be enforced by the State department of factory inspection.

PENNSYLVANIA.

Employers are to cause all employees who are exposed to lead dusts, fumes, or solutions while engaged in the manufacture of lead, lead chromate, lead sulphate, lead nitrate, or fluosilicate to be examined by a physician at least once a month to

ascertain whether symptoms of lead poisoning exist. Physicians making these examinations are to make a report in duplicate on or in conformity with forms furnished by the State department of health. These reports are to be sent within 48 hours, one copy to the State department of health and one copy to the State department of labor and industry. The reports are to show the name, occupation, and address of the employee, the name, business, and address of the employer, the nature and probable extent of the disease, and such other information as may be required by the State department of health; the physician is also to report his findings within 48 hours to the employer.

The enforcement of the law is made the duty of the State department of labor and industry. (Act approved July 26, 1913; effective Oct. 1, 1913.)

WISCONSIN.

Medical practitioners are to report all cases in which the patients are believed to be suffering from poisoning from lead, phosphorus, arsenic, or mercury, or their compounds, or from compressed-air illness, contracted as a result of the nature of the patient's employment. The reports are to be made to the secretary of the State board of health and are to give the name, address, and place of employment of the patient and the nature of the disease.

The enforcement of the law is made the duty of the commissioner of labor and industrial statistics, who is authorized to call upon the State and local boards of health for assistance.

Violation of the act on the part of physicians is made punishable by a fine of not more than $10. (Act approved June 2, 1911.)

TABLES.

In the tables which follow an attempt has been made to show briefly in tabular form the essential requirements of the several State laws relating to the notification by physicians of cases of occupational and industrial diseases. It has not been possible in all instances to show the requirements accurately in this way.

Occupational diseases required by State laws to be reported.

	Poisoning by—						Anthrax.	Compressed-air illness.	All occupational diseases.
	Lead or its compounds.	Phosphorus or its compounds.	Arsenic or its compounds.	Mercury or its compounds.	Brass.	Wood alcohol.			
California	X	X	X	X			X	X	
Connecticut	X	X	X	X	X	X	X	X	X
Illinois	X								
Kansas[1]	X	X	X	X	X	X	X	X	X
Maryland	X	X	X	X			X	X	X
Maine	X	X	X	X			X	X	X
Massachusetts[2]									
Michigan	X	X	X	X			X	X	
Minnesota	X	X	X	X			X	X	
Missouri									X
New Hampshire	X	X	X	X	X	X	X	X	X
New Jersey	X	X	X	X			X	X	
New York	X	X	X	X	X	X	X	X	
Ohio	X	X	X	X	X	X	X	X	X
Pennsylvania	X								
Wisconsin	X	X	X	X				X	

[1] The Kansas requirements are by regulations adopted by the State board of health in December, 1913.
[2] Authority is given to the State board of labor and the industrial accident board, sitting jointly, to promulgate regulations requiring the reporting of occupational diseases. These had not been promulgated up to Dec. 1, 1913.

Occupational diseases.—Information to be given in reports by physicians.

States.	Of patient.							Of employer.			And such other information as may be required by—
	Name.	Address.	Occupation.	Place of employment.	Duration of employment.	Nature of disease.	Duration of disease.	Name.	Address.	Business.	
California	X	X		X		X					
Connecticut	X	X	X			X		X	X	X	Bureau of labor statistics.
Illinois	X	X		X		X	X	X			
Kansas	X	X	X	X		X					
Maryland	X	X	X	X		X					State board of health.
Maine	X	X	X			X					Do.
Massachusetts											
Michigan	X	X		X	X	X					
Minnesota	X	X		X		X					Commissioner of labor.
Missouri				X	X	X	X	X	X	X	
New Hampshire	X	X	X			X		X	X	X	State board of health.
New Jersey	X	X	X	X							Do.
New York	X	X		X							Commissioner of labor.
Ohio	X	X	X			X					State board of health.
Pennsylvania	X	X	X			X					State department of health.
Wisconsin	X	X	X			X					

Occupational diseases.—Other provisions of the several State laws.

State.	Physicians to report to—	Reports to be made—	State board of health to send reports or transcript thereof to—	Penalty for failure of physician to report.	Law enforced by—	Law enacted.	Remarks.
California	State board of health	At once	Bureau of labor statistics.	Fine of not over $10	State board of health	Apr. 21, 1911	Physicians are entitled to a fee of 50 cents for each report.
Connecticut	Bureau, labor statistics.	Within 48 hours		do		July 18, 1911 Apr. 22, 1913	Do.
Illinois	State board of health	At once	Department of factory inspection.			May 26, 1911	Employers are required to have all employees engaged at certain hazardous occupations examined at least once a month to ascertain whether any occupational disease exists.
Kansas	Local health department.	do					
Maryland	State board of health	do	Bureau of statistics and information.	Fine of not over $5	State board of health	Apr. 8, 1912	
Maine	do	Within 10 days		Fine of $5 to $10	do	Mar. 20, 1913	
Massachusetts[1]						June 16, 1913	
Michigan	State board of health		Commissioner of labor.	Fine of not over $50	Commissioner of labor	Apr. 25, 1911	
Minnesota	Commissioner of labor.			Fine of not over $10 or imprisonment of not over 10 days.	do	Feb. 25, 1913	
Missouri	State board of health	Within 24 hours	State factory inspector.	Fine of not less than $50.	State factory inspector.	Mar. 27, 1913	Do.
New Hampshire	do	Within 48 hours	Commissioner of labor.	Fine of $5		May 7, 1913	
New Jersey	do	Within 30 days	do	Fine of $25	State board of health	Apr. 1, 1912	
New York	Commissioner of labor.	At once		Fine of not over $10	Commissioner of labor.	June 6, 1911 Mar. 28, 1913	
Ohio	State board of health	Within 48 hours	Factory inspector			Apr. 23, 1913	Do.
Pennsylvania	State department of health and State department of labor and industry.	do			State department of labor and industry.	July 26, 1913	Do.
Wisconsin	State board of health			Fine of not over $10	Commissioner of labor and industrial statistics.	June 2, 1911	

[1] Authority delegated to a joint board to promulgate regulations requiring the reporting of occupational diseases.

THE MODEL STATE LAW FOR THE REGISTRATION OF BIRTHS AND DEATHS.

A Bill[1] To provide for the registration of all births and deaths in the State of ———.

NOTE.—After the bill has been prepared for presentation to the legislature of a State, the title should be carefully revised by competent legal authority.

Be it enacted by the legislature of the State of ———

SECTION 1. That the State board of health shall have charge of the registration of births and deaths; shall prepare the necessary instructions, forms, and blanks for obtaining and preserving such records and shall procure the faithful registration of the same in each primary registration district as constituted in section 3 of this act, and in the central bureau of vital statistics at the capital of the State. The said board shall be charged with the uniform and thorough enforcement of the law throughout the State, and shall from time to time recommend any additional legislation [2] that may be necessary for this purpose.

SEC. 2. That the secretary of the State board of health shall have general supervision over the central bureau of vital statistics, which is hereby authorized to be established by said board, and which shall be under the immediate direction of the State registrar of vital statistics, whom the State board of health shall appoint within thirty days after the taking effect of this law, and who shall be a medical practitioner of not less than five years' practice in his profession, and a competent vital statistician. The State registrar of vital statistics shall hold office for four years and until his successor has been appointed and has qualified, unless such office shall sooner become vacant by death, disqualification, operation of law, or other causes. Any vacancy occurring in such office shall be filled for the unexpired term by the State board of health. At least ten days before the expiration of the term of office of the State registrar of vital statistics, his successor shall be appointed by the State board of health. The State registrar of vital statistics shall receive an annual salary at the rate of ——— dollars from the date of his entering upon the discharge of the duties of his office. The State board of health shall provide for such clerical and other assistants as may be necessary for the purposes of this act, who shall serve during the pleasure of the board, and shall fix the compensation of persons thus employed within the amount appropriated therefor by the legislature. The custodian of the capitol shall provide for the bureau of vital statistics in the State capitol at ——— suitable offices, which shall be properly equipped with fireproof vault and filing cases for the permanent and safe preservation of all official records made and returned under this act.

SEC. 3. That for the purposes of this act the State shall be divided into registration districts as follows: Each city, each incorporated town, and each township[3] shall constitute a primary registration district: *Provided*, That the State board of health may combine two or more primary registration districts when necessary to facilitate registration.

SEC. 4. That within ninety days after the taking effect of this act, or as soon thereafter as possible, the State board of health shall appoint a local registrar of vital statistics

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[1] Before introducing this bill in any legislature it should be carefully redrafted by a competent lawyer and submitted to the Bureau of the Census for criticism.

[2] The words "and shall promulgate any additional rules or regulations" may be inserted in bills prepared for States in which the State board of health has power to make rules and regulations having the effect of law.

[3] Or other primary political unit, as "town," "precinct," "civil district," "hundred," etc. When there are no such units available, the following substitutes for section 3 may be employed: Section 3. That for the purposes of this act the State shall be divided into registration districts as follows: Each city and each incorporated town shall constitute a primary registration district; and for that portion of each county outside of the cities and incorporated towns therein the State board of health shall define and designate the boundaries of a sufficient number of rural registration districts, which districts it may change or combine from time to time as may be necessary to insure the convenience and completeness of registration.

for each registration district in the State.[1] The term of office of each local registrar so appointed shall be four years, and until his successor has been appointed and has qualified, unless such office shall sooner become vacant by death, disqualification, operation of law, or other causes: *Provided*, That in cities where health officers or other officials are, in the judgment of the State board of health, conducting effective registration of births and deaths under local ordinances at the time of the taking effect of this act such officials may be appointed as registrars in and for such cities, and shall be subject to the rules and regulations of the State registrar and to all of the provisions of this act. Any vacancy occurring in the office of local registrar of vital statistics shall be filled for the unexpired term by the State board of health. At least ten days before the expiration of the term of office of any such local registrar his successor shall be appointed by the State board of health.

Any local registrar who, in the judgment of the State board of health, fails or neglects to discharge efficiently the duties of his office as set forth in this act, or to make prompt and complete returns of births and deaths as required thereby, shall be forthwith removed by the State board of health, and such other penalties may be imposed as are provided under section 22 of this act.

Each local registrar shall, immediately upon his acceptance of appointment as such, appoint a deputy, whose duty it shall be to act in his stead in case of his absence or disability; and such deputy shall in writing accept such appointment and be subject to all rules and regulations governing local registrars. And when it appears necessary for the convenience of the people in any rural district the local registrar is hereby authorized, with the approval of the State registrar, to appoint one or more suitable persons to act as subregistrars, who shall be authorized to receive certificates and to issue burial or removal permits in and for such portions of the district as may be designated; and each subregistrar shall note on each certificate, over his signature, the date of filing, and shall forward all certificates to the local registrar of the district within ten days, and in all cases before the third day of the following month: *Provided*, That each subregistrar shall be subject to the supervision and control of the State registrar and may be by him removed for neglect or failure to perform his duty in accordance with the provisions of this act or the rules and regulations of the State registrar, and shall be subject to the same penalties for neglect of duty as the local registrar.

Sec. 5. That the body of any person whose death occurs in this State, or which shall be found dead therein, shall not be interred, deposited in a vault or tomb, cremated or otherwise disposed of, or removed from or into any registration district, or be temporarily held pending further disposition more than seventy-two hours after death, unless a permit for burial, removal, or other disposition thereof shall have been properly issued by the local registrar of the registration district in which the death occurred or the body was found.[2] And no such burial or removal permit shall be issued by any registrar until, wherever practicable, a complete and satisfactory certificate of death has been filed with him as hereinafter provided: *Provided*, That when a dead body is transported from outside the State into a registration district in ——— for burial, the transit or removal permit, issued in accordance with the law and health regulations of the place where the death occurred, shall be accepted by the local registrar of the district into which the body has been transported for burial or other disposition, as a basis upon which he may issue a local burial permit; he shall note upon the face of the burial permit the fact that it was a body shipped in for

[1] This method of appointment of local registrars by the State board of health—or perhaps by the State registrar or upon his nomination—with a reasonably long term of service and subject to removal for neglect of duty, is the preferable one for efficient service. Should there be objection, however, to the creation of new offices, the section may be redrafted so that it will provide that township, village, or city clerks, or other suitable officials, shall be the local registrars.

[2] A special proviso may be required for sparsely settled portions of a State.

interment, and give the actual place of death; and no local registrar shall receive any fee for the issuance of burial or removal permits under this act other than the compensation provided in section 20.

SEC. 6. That a stillborn child shall be registered as a birth and also as a death, and separate certificates of both the birth and the death shall be filed with the local registrar, in the usual form and manner, the certificate of birth to contain in place of the name of the child, the word "stillbirth": *Provided*, That a certificate of birth and a certificate of death shall not be required for a child that has not advanced to the fifth month of uterogestation. The medical certificate of the cause of death shall be signed by the attending physician, if any, and shall state the cause of death as "stillborn," with the cause of the stillbirth, if known, whether a premature birth, and, if born prematurely, the period of uterogestation, in months, if known; and a burial or removal permit of the prescribed form shall be required. Midwives shall not sign certificates of death for stillborn children; but such cases, and stillbirths occurring without attendance of either physician or midwife, shall be treated as deaths without medical attendance, as provided for in section 8 of this act.

SEC. 7. That the certificate of death shall contain the following items, which are hereby declared necessary for the legal, social, and sanitary purposes subserved by registration records: [1]

(1) Place of death, including State, county, township, village, or city. If in a city, the ward, street, and house number; if in a hospital or other institution, the name of the same to be given instead of the street and house number. If in an industrial camp, the name of the camp to be given.

(2) Full name of decedent. If an unnamed child, the surname preceded by "Unnamed."

(3) Sex.

(4) Color or race, as white, black, mulatto (or other negro descent), Indian, Chinese, Japanese, or other.

(5) Conjugal condition, as single, married, widowed, or divorced.

(6) Date of birth, including the year, month, and day.

(7) Age, in years, months, and days. If less than one day, the hours or minutes.

(8) Occupation. The occupation to be reported of any person, male or female, who had any remunerative employment, with the statement of (*a*) trade, profession or particular kind of work; (*b*) general nature of industry, business, or establishment in which employed (or employer).

(9) Birthplace; at least State or foreign country, if known.

(10) Name of father.

(11) Birthplace of father; at least State or foreign country, if known.

(12) Maiden name of mother.

(13) Birthplace of mother; at least State or foreign country, if known.

(14) Signature and address of informant.

(15) Official signature of registrar, with the date when certificate was filed, and registered number.

(16) Date of death, year, month, and day.

(17) Certification as to medical attendance on decedent, fact and time of death, time last seen alive, and the cause of death, with contributory (secondary) cause of complication, if any, and duration of each, and whether attributed to dangerous or insanitary conditions of employment; signature and address of physician or official making the medical certificate.

(18) Length of residence (for inmates of hospitals and other institutions; transients or recent residents) at place of death and in the State, together with the place where disease was contracted, if not at place of death, and former or usual residence.

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[1] The following items are those of the United States standard certificate of death, approved by the Bureau of the Census.

(19) Place of burial or removal; date of burial.

(20) Signature and address of undertaker or person acting as such.

The personal and statistical particulars (items 1 to 13) shall be authenticated by the signature of the informant, who may be any competent person acquainted with the facts.

The statement of facts relating to the disposition of the body shall be signed by the undertaker or person acting as such.

The medical certificate shall be made and signed by the physician, if any, last in attendance on the deceased, who shall specify the time in attendance, the time he last saw the deceased alive, and the hour of the day at which death occurred. And he shall further state the cause of death, so as to show the course of disease or sequence of causes resulting in the death, giving first the name of the disease causing death (primary cause), and the contributory (secondary) cause, if any, and the duration of each. Indefinite and unsatisfactory terms, denoting only symptoms of disease or conditions resulting from disease, will not be held sufficient for the issuance of a burial or removal permit; and any certificate containing only such terms as defined by the State Registrar shall be returned to the physician or person making the medical certificate for correction and more definite statement. Causes of death which may be the result of either disease or violence shall be carefully defined; and if from violence, the means of injury shall be stated and whether (probably) accidental, suicidal, or homicidal.[1] And for deaths in hospitals, institutions, or of nonresidents the physician shall supply the information required under this head (item 18), if he is able to do so, and may state where, in his opinion, the disease was contracted.

SEC. 8. That in case of any death occurring without medical attendance it shall be the duty of the undertaker to notify the local registrar of such death, and when so notified the registrar shall, prior to the issuance of the permit, inform the local health officer and refer the case to him for immediate investigation and certification: *Provided*, That when the local health officer is not a physician, or when there is no such official, and in such cases only, the registrar is authorized to make the certificate and return from the statement of relatives or other persons having adequate knowledge of the facts: *Provided further*, That if the registrar has reason to believe that the death may have been due to unlawful act or neglect he shall then refer the case to the coroner or other proper officer for his investigation and certification. And the coroner or other proper officer whose duty it is to hold an inquest on the body of any deceased person and to make the certificate of death required for a burial permit shall state in his certificate the name of the disease causing death, or if from external causes, (1) the means of death and (2) whether (probably) accidental, suicidal, or homicidal, and shall in any case furnish such information as may be required by the State Registrar in order properly to classify the death.

SEC. 9. That the undertaker or person acting as undertaker shall file the certificate of death with the local registrar of the district in which the death occurred and obtain a burial or removal permit prior to any disposition of the body. He shall obtain the required personal and statistical particulars from the person best qualified to supply them, over the signature and address of his informant. He shall then present the certificate to the attending physician, if any, or to the health officer or coroner, as directed by the local registrar, for the medical certificate of the cause of death and other particulars necessary to complete the record, as specified in sections 7 and 8. And he shall then state the facts required relative to the date and place of burial or removal, over his signature and with his address, and present the completed certificate to the local registrar in order to obtain a permit for burial, removal, or other disposition of the body. The undertaker shall deliver the burial permit to the person in charge

[1] In some States the question whether a death was accidental, suicidal, or homicidal must be determined by the coroner or medical examiner, and the registration law must be framed to harmonize.

of the place of burial before interring or otherwise disposing of the body, or shall attach the removal permit to the box containing the corpse, when shipped by any transportation company, said permit to accompany the corpse to its destination, where, if within the State of ———, it shall be delivered to the person in charge of the place of burial.

[Every person, firm, or corporation selling a casket shall keep a record showing the name of the purchaser, purchaser's post-office address, name of deceased, date of death, and place of death of deceased, which record shall be open to inspection of the State Registrar at all times. On the first day of each month the person, firm, or corporation selling caskets shall report to the State Registrar each sale for the preceding month, on a blank provided for that purpose: *Provided, however,* That no person, firm, or corporation selling caskets to dealers or undertakers only shall be required to keep such record, nor shall such report be required from undertakers when they have direct charge of the disposition of a dead body.

Every person, firm, or corporation selling a casket at retail, and not having charge of the disposition of the body, shall inclose within the casket a notice furnished by the State Registrar calling attention to the requirements of the law, a blank certificate of death, and the rules and regulations of the State board of health concerning the burial or other disposition of a dead body.][1]

Sec. 10. That if the interment or other disposition of the body is to be made within the State, the wording of the burial or removal permit may be limited to a statement by the registrar, and over his signature, that a satisfactory certificate of death having been filed with him, as required by law, permission is granted to inter, remove, or dispose otherwise of the body, stating the name, age, sex, cause of death, and other necessary details upon the form prescribed by the State registrar.

Sec. 11. That no person in charge of any premises on which interments are made shall inter or permit the interment or other disposition of any body unless it is accompanied by a burial, removal, or transit permit, as herein provided. And such person shall indorse upon the permit the date of interment, over his signature, and shall return all permits so indorsed to the local registrar of his district within ten days from the date of interment, or within the time fixed by the local board of health. He shall keep a record of all bodies interred or otherwise disposed of on the premises under his charge, in each case stating the name of each deceased person, place of death, date of burial or disposal, and name and address of the undertaker; which record shall at all times be open to official inspection: *Provided,* That the undertaker, or person acting as such, when burying a body in a cemetery or burial ground having no person in charge, shall sign the burial or removal permit, giving the date of burial, and shall write across the face of the permit the words "No person in charge," and file the burial or removal permit within ten days with the registrar of the district in which the cemetery is located.

Sec. 12. That the birth of each and every child born in this State shall be registered as hereinafter provided.

Sec. 13. That within ten days after the date of each birth there shall be filed with the local registrar of the district in which the birth occurred a certificate of such birth, which certificate shall be upon the form adopted by the State board of health with a view to procuring a full and accurate report with respect to each item of information enumerated in section 14 of this act.[2]

In each case where a physician, midwife, or person acting as midwife was in attendance upon the birth, it shall be the duty of such physician, midwife, or person acting as midwife to file in accordance herewith the certificate herein contemplated.

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[1] The provisions in brackets may be useful in States in which many funerals are conducted without regular undertakers.

[2] A proviso may be added that shall require the registration, or notification, at a shorter interval than ten days, of births that occur in cities.

In each case where there was no physician, midwife, or person acting as midwife in attendance upon the birth, it shall be the duty of the father or mother of the child, the householder or owner of the premises where the birth occurred, or the manager or superintendent of the public or private institution where the birth occurred, each in the order named, within ten days after the date of such birth, to report to the local registrar the fact of such birth. In such case and in case the physician, midwife, or person acting as midwife, in attendance upon the birth is unable, by diligent inquiry, to obtain any item or items of information contemplated in section 14 of this act, it shall then be the duty of the local registrar to secure from the person so reporting, or from any other person having the required knowledge, such information as will enable him to prepare the certificate of birth herein contemplated, and it shall be the duty of the person reporting the birth, or who may be interrogated in relation thereto, to answer correctly and to the best of his knowledge all questions put to him by the local registrar which may be calculated to elicit any information needed to make a complete record of the birth as contemplated by said section 14, and it shall be the duty of the informant as to any statement made in accordance herewith to verify such statement by his signature, when requested so to do by the local registrar.

SEC. 14. That the certificate of birth shall contain the following items, which are hereby declared necessary for the legal, social, and sanitary purposes subserved by registration records: [1]

(1) Place of birth, including State, county, township or town, village, or city. If in a city, the ward, street, and house number; if in a hospital or other institution, the name of the same to be given, instead of the street and house number.

(2) Full name of child. If the child dies without a name, before the certificate is filed, enter the words "Died unnamed." If the living child has not yet been named at the date of filing certificate of birth, the space for "Full name of child" is to be left blank, to be filled out subsequently by a supplemental report, as hereinafter provided.

(3) Sex of child.

(4) Whether a twin, triplet, or other plural birth. A separate certificate shall be required for each child in case of plural births.

(5) For plural births, number of each child in order of birth.

(6) Whether legitimate or ilegitimate.[2]

(7) Date of birth, including the year, month, and day.

(8) Full name of father.

(9) Residence of father.

(10) Color or race of father.

(11) Age of father at last birthday, in years.

(12) Birthplace of father; at least State or foreign country, if known.

(13) Occupation of father. The occupation to be reported if engaged in any remunerative employment, with the statement of (*a*) trade, profession, or particular kind of work; (*b*) general nature of industry, business, or establishment in which employed (or employer).

(14) Maiden name of mother.

(15) Residence of mother.

(16) Color or race of mother.

(17) Age of mother at last birthday, in years.

(18) Birthplace of mother; at least State or foreign country, if known.

(19) Occupation of mother. The occupation to be reported if engaged in any remunerative employment, with the statement of (*a*) trade, profession, or particular kind of work; (*b*) general nature of industry, business, or establishment in which employed (or employer).

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[1] The following items are those of the United States standard certificate of birth, approved by the Bureau of the Census.

[2] This question may be omitted if desired, or provision may be made so that the identity of parents will not be disclosed.

(20) Number of children born to this mother, including present birth.

(21) Number of children of this mother living.

(22) The certification of attending physician or midwife as to attendance at birth, including statement of year, month, day (as given in item 7), and hour of birth, and whether the child was born alive or stillborn. This certification shall be signed by the attending physician or midwife, with date of signature and address; if there is not physician or midwife in attendance, then by the father or mother of the child, householder, owner of the premises, or manager or superintendent of public or private institution where the birth occurred, or other competent person, whose duty it shall be to notify the local registrar of such birth, as required by section 13 of this act.

(23) Exact date of filing in office of local registrar, attested by his official signature, and registered number of birth, as hereinafter provided.

SEC. 15. That when any certificate of birth of a living child is presented without the statement of the given name, then the local registrar shall make out and deliver to the parents of the child a special blank for the supplemental report of the given name of the child, which shall be filled out as directed, and returned to the local registrar as soon as the child shall have been named.

SEC. 16. That every physician, midwife, and undertaker shall, without delay, register his or her name, address, and occupation with the local registrar of the district in which he or she resides, or may hereafter establish a residence; and shall thereupon be supplied by the local registrar with a copy of this act, together with such rules and regulations as may be prepared by the State registrar relative to its enforcement. Within thirty days after the close of each calendar year each local registrar shall make a return to the State registrar of all physicians, midwives, or undertakers who have been registered in his district during the whole or any part of the preceding calendar year: *Provided*, That no fee or other compensation shall be charged by local registrars to physicians, midwives, or undertakers for registering their names under this section or making returns thereof to the State registrar.[1]

SEC. 17. That all superintendents or managers, or other persons in charge of hospitals, almshouses, lying-in, or other institutions, public or private, to which persons resort for treatment of diseases, confinement, or are committed by process of law, shall make a record of all the personal and statistical particulars relative to the inmates in their institutions at the date of approval of this act, which are required in the forms of the certificates provided for by this act, as directed by the State registrar; and thereafter such record shall be, by them, made for all future inmates at the time of their admittance. And in case of persons admitted or committed for treatment of disease, the physician in charge shall specify for entry in the record, the nature of the disease, and where, in his opinion, it was contracted. The personal particulars and information required by this section shall be obtained from the individual himself if it is practicable to do so; and when they can not be so obtained, they shall be obtained in as complete a manner as possible from relatives, friends, or other persons acquainted with the facts.

SEC. 18. That the State registrar shall prepare, print, and supply to all registrars all blanks and forms used in registering, recording, and preserving the returns, or in otherwise carrying out the purposes of this act; and shall prepare and issue such detailed instructions as may be required to procure the uniform observance of its provisions and the maintenance of a perfect system of registration; and no other blanks shall be used than those supplied by the State registrar. He shall carefully examine the certificates received monthly from the local registrars, and if any such are incomplete or unsatisfactory he shall require such further information to be supplied as may be necessary to make the record complete and satisfactory. And all physicians, midwives, informants, or undertakers, and all other persons having knowledge of the facts, are hereby required to supply, upon a form provided by the State registrar or upon

[1] This section may be omitted if deemed expedient and the duty of supplying instructions may be assumed by the State officer.

the original certificate, such information as they may possess regarding any birth or death upon demand of the State registrar, in person, by mail, or through the local registrar: *Provided*, That no certificate of birth or death, after its acceptance for registration by the local registrar, and no other record made in pursuance of this act, shall be altered or changed in any respect otherwise than by amendments properly dated, signed, and witnessed. The State registrar shall further arrange, bind, and permanently preserve the certificates in a systematic manner, and shall prepare and maintain a comprehensive and continuous card index of all births and deaths registered; said index to be arranged alphabetically, in the case of deaths, by the names of decedents, and in the case of births, by the names of fathers and mothers. He shall inform all registrars what diseases are to be considered infectious, contagious, or communicable and dangerous to the public health, as decided by the State board of health, in order that when deaths occur from such diseases proper precautions may be taken to prevent their spread.

If any cemetery company or association, or any church or historical society or association, or any other company, society, or association, or any individual, is in possession of any record of births or deaths which may be of value in establishing the genealogy of any resident of this State, such company, society, association, or individual may file such record or a duly authenticated transcript thereof with the State registrar, and it shall be the duty of the State registrar to preserve such record or transcript and to make a record and index thereof in such form as to facilitate the finding of any information contained therein. Such record and index shall be open to inspection by the public, subject to such reasonable conditions as the State registrar may prescribe. If any person desires a transcript of any record filed in accordance herewith, the State registrar shall furnish the same upon application, together with a certificate that it is a true copy of such record, as filed in his office, and for his services in so furnishing such transcript and certificate he shall be entitled to a fee of (ten cents per folio) (fifty cents per hour or fraction of an hour necessarily consumed in making such transcript) and to a fee of twenty-five cents for the certificate, which fees shall be paid by the applicant.

Sec. 19. That each local registrar shall supply blank forms of certificates to such persons as require them. Each local registrar shall carefully examine each certificate of birth or death when presented for record in order to ascertain whether or not it has been made out in accordance with the provisions of this act and the instructions of the State registrar; and if any certificate of death is incomplete or unsatisfactory, it shall be his duty to call attention to the defects in the return, and to withhold the burial or removal permit until such defects are corrected. All certificates, either of birth or of death, shall be written legibly, in durable black ink, and no certificate shall be held to be complete and correct that does not supply all of the items of information called for therein, or satisfactorily account for their omission. If the certificate of death is properly executed and complete, he shall then issue a burial or removal permit to the undertaker; provided, that in case the death occurred from some disease which is held by the State board of health to be infectious, contagious, or communicable and dangerous to the public health, no permit for the removal or other disposition of the body shall be issued by the registrar, except under such conditions as may be prescribed by the State board of health. If a certificate of birth is incomplete, the local registrar shall immediately notify the informant and require him to supply the missing items of information if they can be obtained. He shall number consecutively the certificates of birth and death, in two separate series, beginning with number 1 for the first birth and the first death in each calendar year, and sign his name as registrar in attest of the date of filing in his office. He shall also make a complete and accurate copy of each birth and each death certificate registered by him in a record book supplied by the State registrar, to be preserved permanently in his office as the local record, in such manner as directed by the State registrar. And he shall, on the

tenth day of each month, transmit to the State registrar all original certificates registered by him for the preceding month. And if no births or no deaths occurred in any month, he shall, on the tenth day of the following month, report that fact to the State registrar, on a card provided for such purpose.

SEC. 20. That each local registrar shall be paid the sum of twenty-five cents for each birth certificate and each death certificate properly and completely made out and registered with him, and correctly recorded and promptly returned by him to the State registrar, as required by this act.[1] And in case no births or no deaths were registered during any month, the local registrar shall be entitled to be paid the sum of twenty-five cents for each report to that effect, but only if such report be made promptly as required by this act. All amounts payable to a local registrar under the provisions of this section shall be paid by the treasurer of the county in which the registration district is located, upon certification by the State registrar. And the State registrar shall annually certify to the treasurers of the several counties the number of births and deaths properly registered, with the names of the local registrars and the amounts due each at the rates fixed herein.[2]

SEC. 21. That the State registrar shall, upon request, supply to any applicant a certified copy of the record of any birth or death registered under provisions of this act, for the making and certification of which he shall be entitled to a fee of fifty cents, to be paid by the applicant. And any such copy of the record of a birth or death, when properly certified by the State registrar, shall be prima facie evidence in all courts and places of the facts therein stated. For any search of the files and records when no certified copy is made, the State registrar shall be entitled to a fee of fifty cents for each hour or fractional part of an hour of time of search, said fee to be paid by the applicant. And the State registrar shall keep a true and correct account of all fees by him received under these provisions, and turn the same over to the State treasurer: *Provided*, That the State registrar shall, upon request of any parent or guardian, supply, without fee, a certificate limited to a statement as to the date of birth of any child when the same shall be necessary for admission to school, or for the purpose of securing employment: *And provided further*, That the United States Census Bureau may obtain, without expense to the State, transcripts, or certified copies of births and deaths without payment of the fees herein prescribed.

SEC. 22. That any person, who for himself or as an officer, agent, or employee of any other person, or of any corporation or partnership (*a*) shall inter, cremate, or otherwise finally dispose of the dead body of a human being, or permit the same to be done, or shall remove said body from the primary registration district in which the death occurred or the body was found without the authority of a burial or removal permit issued by the local registrar of the district in which the death occurred or in which the body was found; or (*b*) shall refuse or fail to furnish correctly any information in his possession, or shall furnish false information affecting any certificate or record, required by this act; or (*c*) shall willfully alter, otherwise than is provided by section 18 of this act, or shall falsify any certificate of birth or death, or any record established by this act; or (*d*) being required by this act to fill out a certificate of birth or death and file the same with the local registrar, or deliver it, upon request, to any person charged with the duty of filling the same, shall fail, neglect, or refuse to perform such duty in the manner required by this act; or (*e*) being a local registrar, deputy registrar, or subregistrar, shall fail, neglect, or refuse to perform his duty as required by this act and by the instructions and direction of the State registrar thereunder, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall for the first offense be fined not less than five dollars ($5) nor more than fifty dollars ($50), and for each

[1] A proviso may be inserted at this point relative to fees of city registrars who are already compensated by salary for their services. See laws of Missouri, Ohio, and Pennsylvania.

[2] Provision may be made in this section for the payment of subregistrars and also, if desired, for the payment of physicians and midwives. See Kentucky law.

subsequent offense not less than ten dollars ($10) nor more than one hundred dollars ($100), or be imprisoned in the county jail not more than sixty days, or be both fined and imprisoned in the discretion of the court.[1]

SEC. 23. That each local registrar is hereby charged with the strict and thorough enforcement of the provisions of this act in his registration district, under the supervision and direction of the State registrar. And he shall make an immediate report to the State registrar of any violation of this law coming to his knowledge, by observation or upon complaint of any person or otherwise.

The State registrar is hereby charged with the thorough and efficient execution of the provisions of this act in every part of the State, and is hereby granted supervisory power over local registrars, deputy local registrars, and subregistrars to the end that all of its requirements shall be uniformly complied with. The State registrar, either personally or by an accredited representative, shall have authority to investigate cases of irregularity or violation of law, and all registrars shall aid him, upon request, in such investigations. When he shall deem it necessary he shall report cases of violation of any of the provisions of this act to the prosecuting attorney of the county, with a statement of the facts and circumstances; and when any such case is reported to him by the State registrar the prosecuting attorney shall forthwith initiate and promptly follow up the necessary court proceedings against the person or corporation responsible for the alleged violation of law. And upon request of the State registrar, the attorney general shall assist in the enforcement of the provisions of this act.

NOTE.—Other sections should be added giving the date on which the act is to go into effect, if not determined by constitutional provisions of the State; providing for the financial support of the law; and repealing prior statutes inconsistent with the present act.

It is desirable that the entire bill should be reviewed by competent legal authority for the purpose of discovering whether it can be made more consistent in any respect with the general form of legislation of the State in which the bill is to be introduced, without material change or injury to the effectiveness of registration.

THE STANDARD BIRTH AND DEATH CERTIFICATES.

The following are facsimile reproductions of the standard birth and death certificates. They have been reduced in size to meet the requirements of the printed page. The size of the birth certificate is $6\frac{1}{8}$ by $7\frac{7}{8}$ inches, and of the death certificate $7\frac{1}{4}$ by $8\frac{1}{2}$ inches. Copies can be obtained from the Director of the Census upon request.

[1] Provision may be made whereby compliance with this act shall constitute a condition of granting licenses to physicians, midwives, and embalmers.

United States Standard Certificate of Birth.

(Instructions on certain points may be printed on the back. Size of certificate, 6¼ x 7½ inches.)

8—334 d
V. S. No. 109

MARGIN RESERVED FOR BINDING

WRITE PLAINLY, WITH UNFADING INK—THIS IS A PERMANENT RECORD

N. B.—In case of more than one child at a birth, a SEPARATE RETURN must be made for each, and the number of each, in order of birth, stated

PLACE OF BIRTH

County of .....

Township of .....
or
Village of .....
or
City of ..... (No. ....., ... St.; ..... Ward)

Department of Commerce and Labor
BUREAU OF THE CENSUS
STANDARD CERTIFICATE OF BIRTH

Registered No. .....

FULL NAME OF CHILD ..... [If child is not yet named, make supplemental report, as directed

Sex of Child	Twin, triplet, or other? (To be answered only in event of plural births)	Number in order of birth (To be answered only in event of plural births)	Legitimate?	Date of birth ..... (Month), ... (Day), 19.... (Year)

FATHER	MOTHER
FULL NAME	FULL MAIDEN NAME
RESIDENCE	RESIDENCE
COLOR — AGE AT LAST BIRTHDAY ..... (Years)	COLOR — AGE AT LAST BIRTHDAY ..... (Years)
BIRTHPLACE	BIRTHPLACE
OCCUPATION	OCCUPATION
Number of children born to this mother, including present birth	Number of children of this mother now living .....

CERTIFICATE OF ATTENDING PHYSICIAN OR MIDWIFE*

I hereby certify that I attended the birth of this child, who was ..... (Born alive or Stillborn) at ..... M., on the date above stated.

**When there was no attending physician or midwife, then the father, householder, etc., should make this return. A stillborn child is one that neither breathes nor shows other evidence of life after birth.*

(Signature) .....

(Physician or Midwife)

Address .....

Given name added from a supplemental report ....., 19..

Filed ....., 19..

..... REGISTRAR

11—335 e

..... REGISTRAR

MARGIN RESERVED FOR BINDING
This supplemental report is to be pasted beneath the original

8—442
V. S. No. 108

SUPPLEMENTAL REPORT OF BIRTH

(STATE)

(This return should preferably be made by the person who made the original)

Registered Number .....

Place of birth ..... (Registration district) *No.* ..... *St.*

SEX OF CHILD*	Twin,* triplet, or other?	and	Number* in order of birth

DATE OF BIRTH* ..... (Month) ..... (Day) 190.. (Year)

FULL* NAME	FATHER
FULL* MAIDEN NAME	MOTHER

* These items to be entered by the Registrar before giving out this form

I HEREBY CERTIFY that the child described herein has been named .....

(Given name, in full) (Surname)

(Signature) .....

(Physician or midwife)

11—337

United States Standard Certificate of Death.

MARGIN RESERVED FOR BINDING

WRITE PLAINLY, WITH UNFADING INK—THIS IS A PERMANENT RECORD

N. B.—Every item of information should be carefully supplied. AGE should be stated EXACTLY. PHYSICIANS should state CAUSE OF DEATH in plain terms, so that it may be properly classified. Exact statement of OCCUPATION is very important. See instructions on back of certificate.

9—2090
V. S. No. 98

1 PLACE OF DEATH

County .....

Township .....
or
Village .....
or
City ..... (No. .... St.; ..... Ward)

DEPARTMENT OF COMMERCE
BUREAU OF THE CENSUS

STANDARD CERTIFICATE OF DEATH

State of .....

Registered No. .....

[If death occurred in a hospital or institution, give its NAME instead of street and number.]

2 FULL NAME .....

PERSONAL AND STATISTICAL PARTICULARS

3 SEX | 4 COLOR OR RACE | 5 SINGLE, MARRIED, WIDOWED, OR DIVORCED (Write the word)

6 DATE OF BIRTH

..... (Month) ..... (Day) 1 (Year)

7 AGE

..... yrs. ..... mos. ..... ds. | If LESS than 1 day, ... hrs. or ..... min.?

8 OCCUPATION
(a) Trade, profession, or particular kind of work .....
(b) General nature of industry, business, or establishment in which employed (or employer) .....

9 BIRTHPLACE (State or country)

PARENTS

10 NAME OF FATHER

11 BIRTHPLACE OF FATHER (State or country)

12 MAIDEN NAME OF MOTHER

13 BIRTHPLACE OF MOTHER (State or country)

14 THE ABOVE IS TRUE TO THE BEST OF MY KNOWLEDGE

(Informant) .....

(Address) .....

15

Filed ..... 191.....

REGISTRAR

MEDICAL CERTIFICATE OF DEATH

16 DATE OF DEATH

..... (Month) ..... (Day) 191 (Year)

17 I HEREBY CERTIFY, That I attended deceased from ....., 191...., to ....., 191....., that I last saw h..... alive on ....., 191....., and that death occurred, on the date stated above, at ..... m.

The CAUSE OF DEATH* was as follows:

.....

.....

..... (Duration) ..... yrs. ..... mos. ..... ds.

Contributory (Secondary) .....

..... (Duration) ..... yrs. ..... mos. ..... ds.

(Signed) ....., M. D.

....., 191.... (Address) .....

* State the DISEASE CAUSING DEATH, or, in deaths from VIOLENT CAUSES, state (1) MEANS OF INJURY; and (2) whether ACCIDENTAL, SUICIDAL, or HOMICIDAL.

18 LENGTH OF RESIDENCE (FOR HOSPITALS, INSTITUTIONS, TRANSIENTS, OR RECENT RESIDENTS)

At place of death ..... yrs. ..... mos. ..... ds. In the State ..... yrs. ..... mos. ..... ds

Where was disease contracted, if not at place of death? .....

Former or usual residence .....

19 PLACE OF BURIAL OR REMOVAL | DATE OF BURIAL ....., 191...

20 UNDERTAKER | ADDRESS

11—3184

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